

# THE IRON AGE

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## The Small Plant Holds Its Own

By BURNHAM FINNEY  
Detroit Editor, The Iron Age

PERHAPS America's predilection for size, whether it be in a college football crowd or in a factory, has been in large measure responsible for the fact that what its great corporations have done has long been heralded up and down the land, whereas the achievements of its smaller industrial units have gone unsung. However, the downward swing of the business pendulum during the past three years and the resourcefulness shown by many small companies in surmounting the difficulties besetting them has thrown into vivid relief the position which the small plant now occupies and the part it will play in recovery.

Should industrial America look to its myriads of small factories to lead it from the wilderness in which it now finds itself into the promised land of better times? Has the movement toward consolidations and the formation of huge corporations, so pronounced in the decade ended in 1930, spent its force with the result that once again individual enterprise rather than mass effort will be the chief ingredient of success? What are the major elements which compose a profitable small company? These are questions which deserve painstaking scrutiny and adequate answers.

### Still a Small Plant Country

Latest census figures show that only 0.5 per cent of the manufacturing companies in the United States employ over 1000 wage earners, only 1.4 per cent employ over 500 people and 3.4 per cent over 250, according to an analysis made by the National Industrial Conference Board. Moreover, establishments employing 100 workers or less constitute 87.2 per cent of the total wage earners on their payrolls is a larger number than the 24.1 per cent employed by establishments with

THE depression has brought a reappraisal of many ideas that were commonly accepted during the "new era." No longer is it taken for granted that the day of small enterprises is over and that large-scale undertakings will blanket all branches of business. The study by the author, which is the first of a series, discloses that the United States is still predominantly a small plant country and that small businesses have withstood the depression better, in many cases, than their larger rivals.

more than 1000 workers. It is significant that plants with less than 500 employees provide work for 61.9 per cent of the country's total working force. Here then is compelling evidence of what profits and efficiency of management in small plants mean to American business.

These figures alone, however, do not convey the true picture of the posi-

tion occupied by the small plant. Just as few people realized at the time that a downward trend in manufacturing activities was taking place months before the portentous stock market crash late in 1929, few people today are aware of the fact that several years prior to that crash the decline in the number of firms and in the ratio of the smaller firms to the total had stopped and an increase had set in. In fact, this was occurring as long ago as 1925. There was a decline in the number of firm members and proprietors in industries from 173,000 in 1921 to 133,000 in 1925, but this downward movement was halted by 1927 and two years later the total had started to increase. The biennial census of manufactures in 1929 revealed that over two-thirds of all manufacturing establishments have an annual output valued at less than \$100,000, while 90 per cent are in the group with products valued under \$500,000.

That large corporations are more efficiently operated than small companies because of better management and greater resources is a common belief. If this is true, the best proof of it should be found in earnings. Yet Frederick M. Feiker, former director of the Bureau of Foreign and Domestic Commerce, points out that earnings made by over 1100 individual industrial concerns during the past 20 years showed that those firms having investments of less than \$2,000,000 each had rates of earnings 26 per cent greater than firms with larger investments. So far as the immediate past is concerned, reliable figures are meager, but in 1931 electric power consumption by small companies dropped only 0.8 per cent, as against a decline of 8.5 per cent by large companies.

Statistics prepared by certain trade associations confirm the statement that small companies not only have





fared better during the current depression, but usually are less affected by business slumps than larger companies. Where information is available showing the breakdown of orders in a single industry according to size of plants, small units have more than held their own.

Prof. Erwin H. Schell, in charge of the department of business and engineering administration at the Massachusetts Institute of Technology, attributes this ability of the small companies to maintain entrenched positions during the economic crisis to the spirit of comradeship between executives and the rank and file which leads to superior teamwork. Former Secretary of Labor Doak likewise subscribes to this theory, having remarked that "in the smaller plant there is . . . a family feeling which makes for harmony and good service."

However, there are other important factors favoring the small factory as against the large one. Quality cannot be gaged by size; in fact, sometimes quantity is achieved at the expense of quality. The large corporation loses something through sheer bigness, whereas the smaller unit more closely approximates "controlled industry" because of its pliability and low overhead costs. It usually is not plagued with the problem of sizable inventories, capital investments are comparatively fully utilized, ownership and management are close to the job and concentration of authority facilitates quick action. In contrast to the fixed obligations of large corporations as to dividends and interest on plant and equipment, the small factory is relatively free from such fetters.

The small company does not have the many complications and many jealousies attendant upon the proximity of many executives. One of its most highly prized assets is the fact that its general manager is usually in the thick of the selling campaign, knows customers personally and can give a final answer of "yes" or "no" to them when questions are asked, rather than wait upon the pleasure of someone higher up to make the decision, as is the case with the large company. This absence of red tape is especially advantageous today, when almost every order, no matter what the size, is for prompt delivery and in many cases bears a "rush" tag.

#### Motor Highways Stimulate Growth of Small Industries

For many years the location of industrial plants was governed chiefly by the path taken by our railroads, because adequate transportation facilities were almost entirely dependent upon steam carriers. No longer is this true, for the construction of good roads, the development of motor truck hauling and the growth of cheap power have enabled industry, particularly small units, to seek economical sites in the foothills, far removed from the congestion, high

rents, high taxes and high labor rates of large cities, where employees can live in relative comfort nearby and raise at least part of their food on their own plots of ground.

This turn of events has given tremendous impetus to small industries. Under such conditions even the man who personifies Big Business, Henry Ford, has constructed seven small plants on water sites near Dearborn, Mich., devoted to the manufacture of parts for Ford cars. These units, employing from a dozen to several hundred men each, are giving Mr. Ford an opportunity to test the practicability of his theory that the worker is safest and most contented when he has "one foot in industry and the other in the soil."

Whether situated in the city or in rural districts, many small companies serving specialized industries and confining their activities to a small section of the country are thriving at the expense of their more powerful competitors. While admittedly some types of small businesses, such as commercial heat-treating plants, by their very nature can profitably serve only a restricted area, some of the most successful companies stretch their sales effort across the entire continent. Here is a manufacturer of metal industrial scales, there a producer of cutting tools, each doing business on a national scale. They are typical of thousands of plants with similar programs.

#### Quality of Management Important

The small plant operator must beware of the frills and fads which have attached themselves, like barnacles on a ship's hull, to so many large corporations. He must be careful to adapt to his own needs, not adopt in toto, the ideas which have been successfully worked out by the industrial giants. Says D. R. Stevens, vice-president and works manager of the Okonite Co., Passaic, N. J., "The small plant can fall into bad habits by copying the large plant, but the small plant under broadminded leadership has every possibility of making the better comparative showing."

This brings us to the inescapable conclusion that the success of any company, large or small, rests upon the caliber of its executive direction. Smallness, in fact, may be an asset provided there is far-visioned, enlightened management. Mr. Stevens declared recently that "the roots of . . . greatest efficiency lie in the smaller plants, but only in the case where they have an able, well-trained, level-headed management."

Near the top of the list of qualities which management must possess if it expects to make a small company stand up against competition is an intelligent aggressive merchandising policy. It may possess modern plant equipment, skilled workers, low overhead and a good product, but these assets are rendered useless unless sales can be made. The planning and execu-

tion of a sales program might well be termed the keystone in the business arch.

In the fall of 1931 the Bureau of Foreign and Domestic Commerce made a survey of 205 concerns which were progressing as usual or better than usual in spite of the depression. In most cases they were relatively small. It was discovered that increased sales effort and an intensified advertising policy were the most important reasons responsible for their successful operation. Among the other reasons enumerated were market research, reduced prices, cooperation with dealers, improvement of service, management of salesmen, development of new products and improvement of quality, all of which are related to the merchandising side of business.

During the depression a southern Ohio builder of machine tools and tool room equipment has maintained a fairly even flow of orders because it has consistently kept its products abreast of the latest engineering design, long ago diversified its lines so as not to be dependent on one product, aggressively advertised where others ceased their efforts, and left no stone unturned to get every possible order. And incidentally it didn't secure its orders by slashing prices, as it has a cost record system running back to 1914 and therefore knows how much it must charge in order to make a profit.

A northern Indiana metal products manufacturer has increased its sales each year, despite the depression, by concentrating on new lines recruited from a special small order group, thereby offsetting losses in volume in its regular products. Special attention was given to answering inquiries promptly and sending with the reply a blue print showing various possible designs. Its catalog was enlivened by the revision of material and illustrations. It wrote all customers suggesting that it was in a position to make its products for special requirements, at the same time advertising this fact in the leading industrial papers.

Trying to discover new products which would give its plant additional work not only now but in the future, a Mid-Western company recently submitted a bid on a certain job in competition with a much larger company long experienced in the contemplated type of work. The prospective customer knew that the small plant's old products were of fine workmanship and of good material, but it was skeptical of the company's ability to turn out this new job which it had never before tackled.

This did not discourage the small plant's manager. He called a conference of his two fellow officers, the shop superintendent, his designer and his sales engineer. After talking over the matter, they decided to invest \$2,000 (a considerable sum to them) to build one of the new articles and prove to the skeptical customer that



he need have no fear in giving them the work. The small manufacturer built the article, convinced the customer and subsequently received orders which justified his having taken a chance. This is the kind of courage which has kept this small company a step ahead of its competitors during the depression.

#### Making Rather Than Taking Orders

One might go on from one individual concern to another *ad infinitum* reciting what proper attention to the selling end of their business has done for them. Let it suffice to say that Massachusetts Institute of Technology discovered from a study of over 200 small establishments that more than half of the time of the typical proprietor is given to marketing problems, and a large share of the time spent in marketing is devoted to obtaining new business. Professor Schell of that institution warns the small manufacturer, however, that he must

delegate that duty to others if he is to protect the future of his company. The job of the general manager of the small concern should be to go into the field personally and study the trends of demand, ascertain the new and undeveloped uses for his manufacturing skill and gage the nature of oncoming competition.

"He must merchandise his manufacturing resources rather than sell present products. He must make rather than take orders. He must capitalize customer goodwill by gaining advice as to the changing trends of their requirements. His preeminent question to his clientele must be, 'Let us find out how we can continue to do business together.' He must remember that he has never sold a product. Rather has he sold satisfactions either in the form of profits to the industrial producer or middleman, or of personal gratifications to the customer. His task, which he cannot delegate to

others, is to find future mediums for continuing that service."

These are words of wisdom which every small plant executive should study. They are the quintessence of success. If they are heeded, he should not fear competition, for superior physical resources do not spell profits.

With intelligent direction, modern plant facilities, low overhead, skilled workmen, and only modest financial resources, the small plant is in the best competitive position in years. With these advantages, plus a well planned and executed merchandising policy, it should face the future with confidence.

"If size in the past has been one of the shrines at which we have worshipped in industry," said Mr. Feiker recently, "it is quite apparent at the moment that the God of Size has clay feet and that there are advantages in being small as well as in being large."

## Disk Wheels for Locomotives

THE conventional spoke type of locomotive driving wheel center is usually a steel casting consisting of a heavy chunk of counterbalance, a comparatively light rim, light spokes, and heavy axle and crank pin hubs.

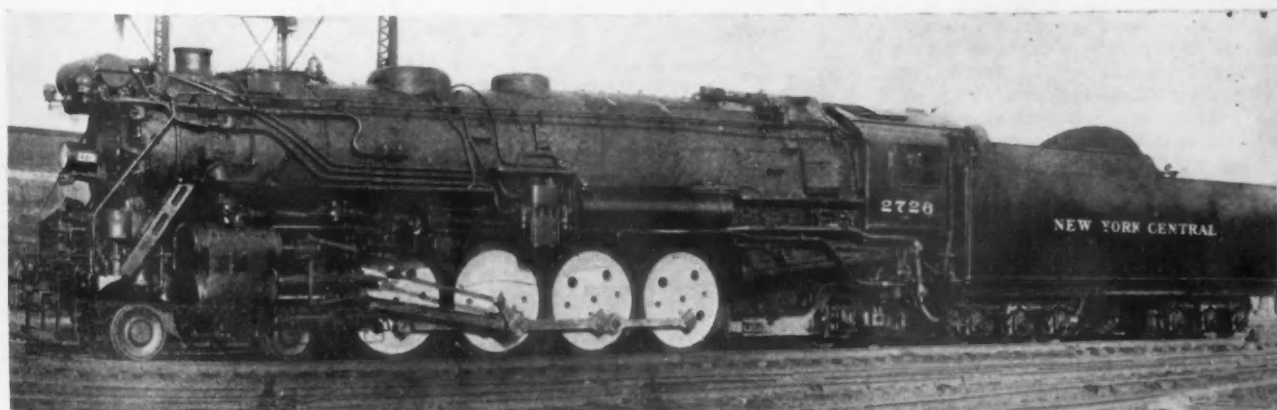
It is difficult, if not impossible, for a foundry to make such a casting and not have abnormally high shrinkage stresses where the spokes join the hubs and the counterbalance. Failure of driving wheel centers in service is due principally to cracked spokes, also cracks in the hubs starting between the spokes. The cracked spokes are due to the causes above enumerated and are further aggravated by the stresses due to the shrinking on of the tires, because the wheel is saucer-shaped and the maximum stress in the spokes occurs at the outside edge at the junction with the hubs.

The wheels also tend to get out of round at positions which might be designated as four and eight o'clock considering the center of the counterbalance above the main hub as 12 o'clock. The stresses imposed by the shrinking on of the tires tend to straighten the rim between the spokes, thus causing flat spots which require shimming. Shrinking on of the tires also tends to buckle the wheels, forcing the hub outward, because of the fact that the stress is acting at an angle from the center of the rim to the center of the main hub.

The new design of double disk wheel center corrects this difficulty as the rim is continuously supported by the two disks. With it, the main and crank pin hubs are lighter than with the conventional spoke design. The disks reinforce the hub and aid in securing the necessary press fits

for the crank pins and axles. More weight can be counterbalanced with the double disk wheel than with the spoke-type wheel. This is of utmost importance in the heavy-type freight locomotives which have small wheels and heavy revolving and reciprocating weights to be balanced. The interior of the wheel between the disks is closed, after the casting has been cleaned, by welding plates to the two disks, so that no foreign matter or water may enter.

The double disk wheel, being a practically uniform section of metal, makes it possible to produce a much better casting than with the spoke design, it is stated. Also, the wheel is lighter, averaging about 10 per cent less in weight, and is about 50 per cent greater in strength in the lateral direction than with the spoke design.



Disk wheels recently designed for locomotives are stronger, lighter and less expensive than the familiar spoke design of drivers, according to the Scullin Steel Co., St. Louis, originator of the new wheels. The New York Central locomotive shown is the first to use these disk wheels in service.







# Production Control System Employs Addressograph Equipment

Following is the procedure for carrying out this work:

An Addressograph plate is prepared for each item manufactured, known as plate No. 1. The plate has on it the part number, the part name, the stock room in which the part is kept, the material from which it is made, the quantity of material per hundred pieces, the department in which it is made, and the number of operations necessary to make it.

In addition to printing the information embossed on an Addressograph plate, these machines are so arranged that printer's numbering devices, dating devices, etc., can be inserted in them and impressions taken from these devices at the same time impressions are taken from the Addressograph plate.

When it is desired to issue a production order to manufacture a lot of

tion numbers, the department in which the operations are performed and the time or number of days prior to the date (on the upper portion of the card) on which this work is to be performed. Thus, the time opposite

vided for that purpose. When these orders have been written, a Production Traveler Card, Form No. 1, a Production Material Requisition, Form No. 2, and the Identification Tag, Form No. 4, are sent to the Raw

PRODUCTION MATERIAL REQUISITION									
PART NO.		26-4041-3 STOP LOCK		21410		SHOP ORDER		21410	
LOCATION						DATE ISSUED		DEC. 12 1932	
MATERIAL		.101"X1-1/16"X2-7/8"H.H.C.R.S.S.		P-2988		QUANTITY		50	
SPEC.		100 PCS. PER 100				DEPT.		107M-107D-105	
DELIVER		8 OPER.							
BY	DATE	PCS.	DATE	ISSUED BY	FILLED BY				
DATE	PER	TOTAL COST	LES. ACCT.	LES. ACCT.	70% COST	CNC		SHOP ORDER	
				9999999999		999		999999	

FORM NO. 2

26-4041-3 STOP LOCK	21410
.101"X1-1/16"X2-7/8"H.H.C.R.S.S.	DEC. 12 1932
100 PCS. PER 100 P-2988	50
DEPT. 107M-107D-105	
8 OPER.	

FORM NO. 3

Stock Department. The raw stock properly tagged is sent to the department having the first operation as shown in the heading of this order. The tag is attached to the material and the Production Material Requisition

26-4041-3 STOP LOCK	21410
.101"X1-1/16"X2-7/8"H.H.C.R.S.S.	DEC. 12 1932
100 PCS. PER 100 P-2988	50
DEPT. 107M-107D-105	
8 OPER.	

FORM NO. 4

parts to the shop, the following forms are filled in from this plate on an Addressograph machine:

- Form No. 1—Production Traveler Order
- Form No. 2—Production Material Requisition
- Form No. 3—Production Order Notice to Cost Department
- Form No. 4—Identification Tags to Be Fastened to Material Travelling Through the Shop
- Form No. 5—Stock Tracing Sheets on Which a Record of Progress of the Parts Through the Shop Is Made

Form No. 1, the Production Traveler Order, in addition to carrying the information shown on plate No. 1, is filled in in the lower section of the card by a second plate. The imprints from this plate show the opera-

tion, the first operation is 13 days, the time opposite the second operation, 12 days, the third operation, 11 days, etc.

## Time of Starting Indicated

This means that these operations must be performed that number of days prior to the date shown in the heading of the card. From this information it is a simple matter to fill in the starting date for each operation as called for in the column pro-

tion, Form No. 2, is properly filled to give the exact number of pieces or the exact number of pounds applied on the order.

This form is then sent to the cost department to be used for tabulating cost information. The cost department notice of order is used as an index card in the tabulating file to keep cards on the same order together. The Stock Tracer, Form No. 5, is retained in the Production Department and as



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Assembly orders and sub-assembly orders are also handled on the Addressograph-Multigraph equipment. A Bill of Material, Form No. 7, is issued for each assembly order. This form, of course, consists of as many pages as are necessary to cover the parts required on the assembly order. The number at the upper left-hand corner of this form is printed from a numbering device and is the assembly order number. The number in the upper right-hand corner is printed from

be made at the rate of approximately 500 an hour. Variable information, such as order numbers, quantities, dates, etc., may be printed with the proper devices provided for that purpose, and standard headings may be printed from electros set in the machine.

Two copies of this sheet, Form No. 7, are printed, one on green paper and one on white. These two copies, attached to the Production Travel Order, Form No. 1, for the assembly

plate and forms which are to be printed on them. It is, therefore, necessary to have some slight differences in each one of the machines on this order on the final assembly. In order to take care of the records of these differences, 12 sets of sheets, Form No. 8, furnished in duplicate, one green and one white copy, one set for each machine on the order, are sent to the foreman with this order.

When he receives the sales order for one of these machines he indicates on

30968		12	
PART NO. 4A-11-6A MODEL 200 GROUP INDEX #4			
NAME REQ STANDARD PARTS SHEET #1 OF 1			
OPER NO. 1 ASSEMBLE DATE JUNE 18-1932			
DEPT. #114 ALL STYLE PLATES			
REC BY BILL OF MATERIAL POSTED BY.....			
QUAN.	PART NO.	COST	QUAN. PART NO. COST
1	HA-354-1A		1 HA-5089 #658
4	HA-1030		4 HA-5081 #100
1	HA-1130		1 HA-5120
1	HA-1131		1 HA-5121 #52
1	HA-1132		2 HA-5160
1	HA-1133		1 HA-5161
1	HA-1141		
1	HA-1145		1 HA-5502-A
2	HA-5027		1 HA-5505 #106
1	HA-5130		1 HA-5520-1
1	HA-5131		1 HA-5507
1	HA-5407		1 HA-5601-A
1	HA-5408		1 HA-6005 #113
1	HA-5409		1 HA-6006 #362
4	HA-4736		1 HA-50432 #255
4	HA-4737 #773		1 HA-50610
1	HA-4740 #169		2 XM-87 #41
1	HA-4741		2 XM-114
1	HA-4742		1 EF-7331 #229
2	HA-5004		8 HQ-2082 #106
1	HA-5073-A		2 F2-2062 #646
1	HA-5074-A		2 HA-3961 P367
DEPT. #205 FINAL INSPECTION & COUNT			
DEPT. #207 STOCK			
GROUP INDEX #4			

FORM NO. 7

a numbering device and is the quantity of machines authorized on the order.

The remaining information on this is printed from an Addressograph plate and numbering device on a Dupligrath machine, as illustrated. These machines are arranged so that they will print complete information covering any standard size form from 3 x 5 in. up to 8 1/2 x 13 in. A plate is embossed with the information. This plate with an impression from it shown on the index in back of it, is a permanent material record file for all assemblies.

As impressions are required from them, the plates are simply laid in the Dupligrath machine. Impressions can

job are sent to the stock room. The stock keeper detaches the first copy as a requisition and sends the material with the Traveler Order and the green copy to the assembly department as a notice of the material sent out.

#### Taking Care of Variations in Attachments

In the particular case of the Model 200 machine as shown in Form No. 7, there are two pages of parts covering the parts entering into the basic machine. These machines, however, are made with quite a variation of attachments, some of which are built into the machine. They must be arranged to suit the proper Addressograph

99999		1	
PART NO. MODEL 100-200 GROUP INDEX #8			
NAME ADJUSTING MACH 300 SHEET #1 OF 1			
OPER NO. 2 ASSEMBLE CHECK SHEET DATE JUNE 20-1932			
DEPT. #114 ALL STYLE PLATES			
REC BY..... BILL OF MATERIAL POSTED BY.....			
QUAN.	PART NO.	QUAN.	PART NO. COST
			RIBBON
			RIBBON GUIDE
			SPOOL GUIDE
			RIBBON SUPPORT
			RIBBON GUARD
			COUNTER
			EJECTOR
			GAUGE
			CHECK GAUGE
			CHUTE
			PLATEN
			PLATEN HEAD
			LISTER
			NUMBER ATTACHMENT
GROUP INDEX #8			

FORM NO. 8

this sheet for one of the machines the variations in that machine from standard and sends the sheet in duplicate to the stock department. The stock department supplies him with the necessary parts as indicated on this sheet, retaining the white copy as their requisition and sending the parts out to him again accompanied by the green copy. With this arrangement it is possible to order out easily and rapidly all parts ordered for the basic machine and also to supply exact lists for all variations from the standard that exists in the machines for specific order.

In many plants where a similar problem develops it is customary to  
(Concluded on Advertising Page 8)



# Needless Transportation in Industry

By RALPH H. SWEETSER

Blast Furnace Consultant, Stevenson Co.  
Wellsville, Ohio

**U**SELESS moisture, removable sand and extraneous ash in amounts hitherto regarded as normal components of industry's raw materials, exact in the aggregate a heavy transportation toll. The author urges that the time has arrived to eliminate these "useless volumes." In the matter of iron ore, the lower iron content of today's supplies (which means also increased amounts of silica and moisture to be freighted from mine to furnace, let alone passed through the furnace) requires 400 excess cargoes for the Lake ore boats and 68,000 excess car loadings in a normal year over what would be needed were the ore still of the character that was obtainable 30 years ago.



**I**N his address before the Metallurgical Advisory Board of the Carnegie Institute of Technology at Pittsburgh last October (The IRON AGE, Nov. 10, 1932), Editor Van Deventer certainly presented a tough outlook for the steel industry. He admitted that the industry itself is tough and that "there are no hazards facing the industry that cannot be overcome through earnest and honest cooperation \* \* \* by a distribution-minded industry." But this must be done by "shaking off the shackles of tradition."

It is true that the whole steel industry in this country has been "production-minded" ever since the '90's, and in that period we surpassed all nations in steel tonnage and we became truly a world power. It was exhilarating to have a part in that continual breaking of tonnage records; evidently it is now Asia's turn to enter that "phase of expansion" in which the steel industry runs to great and still greater annual tonnages, and production-minded Americans will help to break records in Russia and India.

## Freight Paid in Useless Haulage

Whether or not the steel industry has passed its production peak in pig iron and steel ingots, and must be readjusted to volumes less than the business of 1928 and 1929, there are tonnage volumes within the industry itself that must be decreased because they are not only needless, but they have become an unprofitable burden on the whole steel-making system. I refer to the transportation of excess moisture and silica in iron ores and of

excess moisture and ash in coal. A unit of iron and a unit of fuel are the double foundation of the whole steel industry. It is the extraneous material that accompanies these two items on their way from the mines to the steel plants that is adding such a heavy burden to the cost of assembling the materials for a ton of ingots.

Thirty years ago non-Bessemer Mesabi ore was \$2.75 per ton, f.o.b. Lake Erie ports, compared with \$4.50 today. The base unit on which the price per ton was applied was 52.80 per cent iron in 1902, and is now 51.50 per cent. The average analysis of Lake Superior ores of all grades then and now may be expressed as follows:

	1902	1930
Iron, per cent.....	55.39	51.33
Silica, per cent.....	5.69	7.75
Moisture, per cent....	8.71	10.92

With the decrease in iron content of 4.06 points in the average ton of ore there has been a corresponding increase of 0.14 ton of ore required to make a ton of pig iron, which amounts to 7.91 per cent more ore required now than was needed 30 years ago. On a total movement of 34,000,000 tons per year (approximate annual average for 10 years ending with 1930) this means 4,760,000 tons of excess ore required to be hauled to furnaces over and above the amount required on the basis of the analysis of 30 years ago. This means about 400 excess cargoes for the Lake ore boats, and 68,000 excess car loadings (of 70 tons) for the railroads.

It certainly is "tough"—to quote Mr. Van Deventer—to think of still

further reducing the traffic on the Great Lakes and on our ore carrying railroads by 4,760,000 tons per year for iron ore; but something of this kind must be done. It is needless transportation. The steel industry will do well to squeeze out this useless water and silica in its iron ores.

Just how far beneficiation can go in restoring the former high percentages of iron in the ore shipped is an engineering problem and a matter of net savings. The state of the art of enriching iron ores has advanced far enough so that the final product, sintered ore, has passed through the period of doubt and resistance from blast furnace operators. It has become recognized as one of the standard sources for iron units. The natural iron content of sintered ore is generally higher than the average of Lake Superior ores 30 years ago, quoted above.

## Points to Ore Beneficiation

When the chemists, engineers and cost accountants have presented the data showing the extra cost of beneficiation at the iron ore mines and showing the savings in transportation and smelting costs, then the executives will decide whether it is better to continue the practice of big volume on the Great Lakes and on the railroads and through the blast furnaces, or to acknowledge the need of eliminating 8 to 10 per cent of useless volume of ore and make adjustments accordingly. History of obsolescence in the iron industry shows that excessive assembling costs due to transportation of useless volume will eventually drive steel plants to seek more favorable conditions. Useless volume in steel making must be accompanied by very short hauls in order to be profitable.

Cheap water transportation is again playing a strong part in reducing assembling costs, but that is no reason why full advantage of reduced bulk should not be included also. It is more necessary for the blast furnaces in the Pittsburgh region and in the Mahoning Valley to enrich their iron ores than it is for Lake Front furnaces; they are already reducing the amount of useless ash in their coal supplies.

Beneficiation of iron ores in the Lake Superior region is on the increase but not yet far enough advanced to make a decided decrease in the volume of iron ore required per ton of pig iron. The progress in beneficiation in the Cornwall district of Pennsylvania, in the Adirondack region of New York State, and in northern New Jersey is more striking. These enriched magnetic iron ores are finding their supremacy areas; they mean less railroad freight, but it is volume reduction that will prove helpful to the steel industry.

The coal industry was forced some ten years ago to squeeze out useless (Concluded on Advertising Page 8)



# Rustless Steels Employed in Fan Construction

By M. S. KICE, JR.

Assistant Chief Engineer  
American Blower Corp., Detroit

**T**WO reasons for selecting other than ordinary steel for fan construction arise from the required movement on the one hand of corrosive gases, and, on the other hand, of gases at elevated temperatures, that is, above 750 deg. F.

By rustless steel is meant one or the other of two types, one, containing from 14 to 30 per cent chromium, and the other, the well-known "18-8" alloy containing on the average 18 per cent chromium and 8 per cent nickel. The word "rustless" means that the metal does not rust when exposed to ordinary atmosphere under conditions of rain, wind, snow, smoke, sunshine, salt air, etc. It does not mean that the metal will resist the action of all acids, alkalis, and salts. There is no commercial alloy or metal that has this priceless quality. However, rustless iron fairly successfully resists corrosion of most commercial materials except hydrochloric, sulphuric, and sulphurous acids. It is particularly resistant to nitric acid.

In this article, the term "fan" will be used to designate either a blower or an exhauster of the housed type, and not the propeller type commonly called the disk fan. The latter, how-

**B**OTH high-chrome and 18-8 alloy steels are utilized by the fan designer for parts exposed to the drastic action of corrosive gases or of very hot gases. Considerations influencing the application of these materials for each of these service conditions are outlined in this article, the first of a series of two.

ever, is sometimes made of rustless steel for various reasons, where the cost of the metal can be justified.

Generally, the fan consists of two parts, the stationary parts, that require little strength, and the rotating parts, the fan application limit of which depends fundamentally upon

the strength of the material used under the condition involved.

## Ease of Fabrication Considered

Rustless steel fans to resist corrosion are built in the same general manner as fans for handling ordinary air, such as ventilating fans, except that all parts, even down to rivet heads and welding fillets have to be made of rustless steel, that is, all parts coming in contact with the corrosive gas. Outside parts, such as stiffeners, bedplates, bearings, etc., can be made of ordinary material.

Selection of the alloy has to be considered not only from the standpoint of its resistance to the gas handled, but also as to whether the metal is suitable for ordinary fabricating operations such as die forming, rolling, punching, machining, welding, etc., whether it can be obtained in castings that are machin-

FIG. 1—Special heavy-duty Sirocco fan wheel (below)

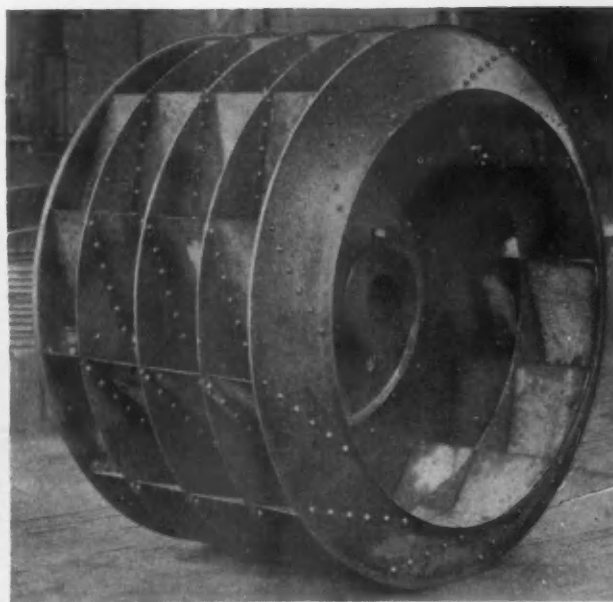
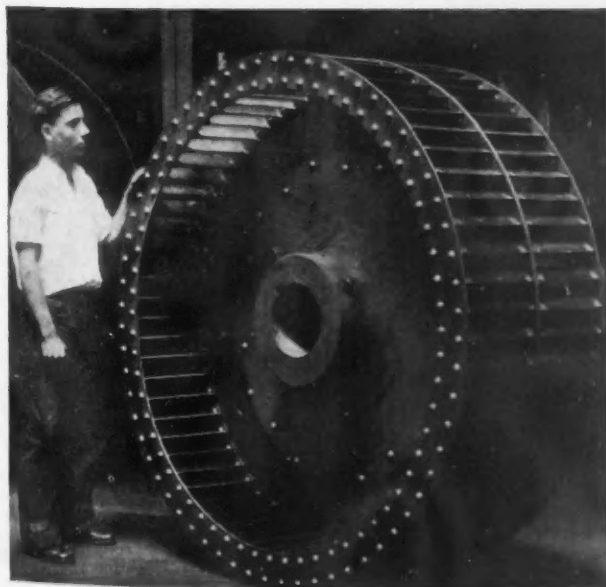


FIG. 2—High-speed fan wheel (above)

able, and whether it is available commercially at a reasonable price and prompt delivery in the usual plates, rods, rivets, etc. As a rule the particular rustless steel structural shapes suitable for fan construction are not

(Continued on Advertising Page 10)



# Manufacture and Heat Treating of Twist

**T**HE modern twist drill began to take form from the old style flat drill along in 1860, for it was about this time that the milled flutes with helix angles and more efficient forms of point grinding were first introduced. For years the twist drill was made from carbon steel and heat treated, but its field of usefulness and speed of operation were greatly augmented when high-speed tool steels and alloys were introduced.

At the present time small drills, or those from 3/64 to 11/64 in. constitute about 90 per cent in number or 30 per cent in tonnage of the entire twist drill production. These are called straight shank wire drills and are milled on the spiral in special machines with a series of lead screws, each corresponding to the lead of the spiral of the drill being milled. Stationary revolving cutters mill the full depth and width of each groove or flute in a single cut. The thickness of the web between the flutes is increased from point to shank at the rate of 0.012 in. per linear inch by a gradual dropping of the bed of the machine, which widens the distance between the center of the drill and the cutters.

This method is employed at the plant of the American Twist Drill Co., Detroit. Most of the drills made there are of the following analysis: Carbon 0.68-0.73 per cent; tungsten 18.00; chromium 4.00; vanadium 1.00; manganese 0.25; silicon 0.20; and sulphur and phosphorus 0.015 per cent each. In the larger sizes the shanks are

made from cold-drawn bars and butt welded to the drills. Shank stock of two analyses is used, first, carbon 0.40-0.50 per cent, manganese 0.50-0.80, phosphorus 0.045, and sulphur 0.05 per cent maximum; and second, carbon 0.15-0.25 per cent, manganese 0.30-0.60, chromium 0.45-0.75, nickel 1.00-1.50, sulphur 0.045, and phosphorus 0.04 per cent maximum.

## Fourteen Operations on Hot Forged Drills

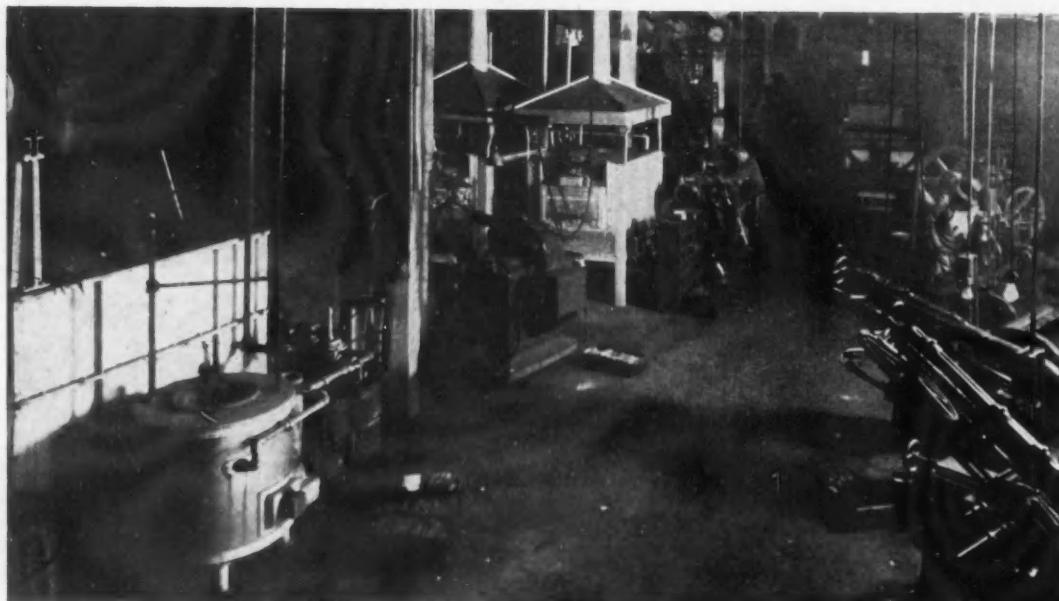
Drill sizes from 11/64 to 1/2 in. are made from rough drawn bars. These are milled, point ground, etc., by the drill manufacturer. Those over 1-in.

are hot forged from hot-rolled bars and there are about 14 major operations including the heat treatments. These are as follows:

1. Cut off shank and drill stock to proper lengths.
2. Butt weld together.
3. Normalize.
4. Forge the flutes.
5. Anneal.
6. Twist and roll.
7. Second anneal.
8. Saw off to correct length.
9. Point turned to proper angle.
10. Shank end center-drilled.
11. Diameter and shank turned to dimensions.



Large gas-fired furnace for hardening large high-speed drills is shown at right. The vertical gas-fired furnace at left is for hardening drills ranging from 1/16 to 1 1/2 in. in diameter (above)



View of American Twist Drill Co. plant showing circular gas-heated lead pot and two gas oven type furnaces used for annealing.



# 3 of Twist Drills

By J. B. NEALEY  
American Gas Association

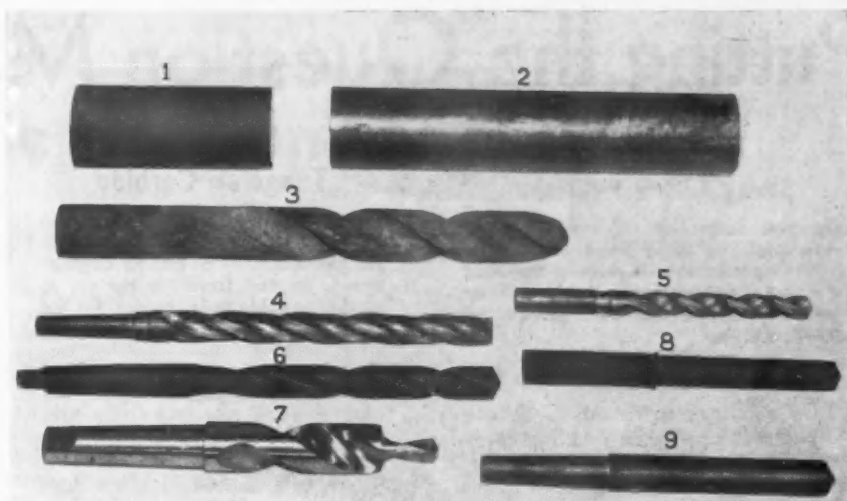
12. Grooves milled or ground.
13. Clearance milled with form cutter or end mill.
14. Heat treat.

Forging of the flutes or grooves is accomplished in a three impression die using repetitive blows of the hammer and within a temperature range of 1800 to 2100 deg. F. Due to its hardness and toughness, this is one of the most difficult steels to forge and requires from one to five reheats according to the thickness of the cross-section. The light repetitive blow method of forging is employed to break up any carbide segregations that might exist, and to further refine the grain structure of the metal. A three impression die is utilized, the order being breakdown, rough forge and finish forge.

The forge furnaces are of the slot type and are fired with gas burners. Of brick and steel construction, they are approximately 4 ft. in every dimension and are set on 2-ft. legs so as to stand at a height convenient to the operator. There are three gas burners located in each end, six in all, and these underfire the work. An automatic temperature control is provided which so regulates the flow of fuel to the burners as to always maintain the temperature set on the dial. Other furnaces of the same type are used for preheating the stock which is heated to just below the grain growth range before being transferred to the high heat furnace. Rapidity in heating in the latter furnace and during reheats while working is a most vital factor in the forging of this type of steel.

## Annealing Refines Grain Structure

Normalizing is accomplished at 1700-1750 deg. F. and the stock is allowed to cool in the furnace. When slowly cooled from the last forging heat the grains grow to a prohibitive coarseness and the forged drill becomes brittle because of insufficient mechanical working on the last reheat. This condition is overcome by annealing to refine the grain structure, a temperature of about 1600 deg. F. being employed. The practice is to pack the drills in pipes with sand and charcoal, the amount of charcoal being just sufficient to overcome any oxygen that might be present. It requires from 6 to 8 hr. to bring this



Twist drills in the making. At 1 is shown the S.A.E. 1045 steel shank before butt welding to the high-speed drill blank. 2. A forged, twisted and annealed drill is shown at 3, and a two-lip and a three-lip drill with grooves milled and ready for hardening, at 4 and 5. The two-lip drill at 6 has been hardened and the one at 7 has been finished and is ready for final inspection. A drill blank as it appears after butt welding and after being turned, preparatory to milling the grooves is shown at 8 and 9.

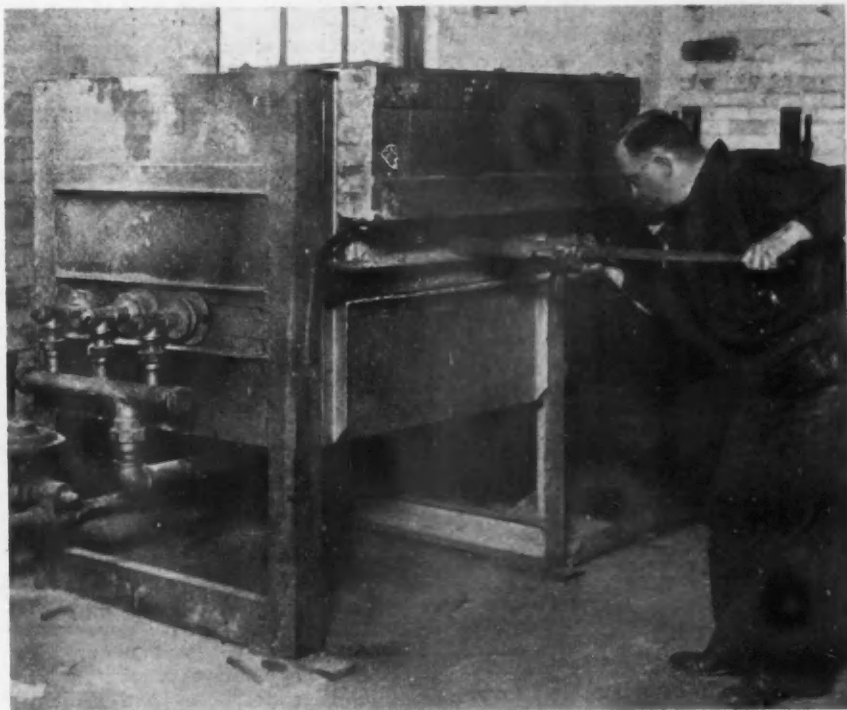
work up to temperature and it is allowed to soak in this heat 1 hr. for each inch of cross-section. It is then cooled slowly in the furnace.

The drills, after being unpacked from the pipes, are reheated for twisting, a temperature of about 2150 deg. F. being employed. The twisting machine consists primarily of a series of plates, laid one on top of the other, each plate with a center hole formed to fit the drill and its flutes. After inserting the drill it is clamped tightly at the top, and each of these plates is turned through the exact arc to give the drill the proper twist at that point. Of course, all of the plates are

turned at the same moment the arcs being progressively larger from shank to the point. The drill is then put through rollers to straighten, both operations being performed on the same heat. When cooled the drill, which is too hard for machining, is given a second anneal that is exactly like the one described.

The final heat treatment is designed to produce a martensitic grain structure and is accomplished by first preheating in a lead bath to 1600 deg. F. and then bringing up to 2350 deg. F. in a high-heat furnace. These two heatings require from 1 to 5 min.

(Concluded on Advertising Page 8)



Forge furnaces are of slot-type and are gas fired. Drills are placed in a row and as one drill reaches furnace temperature it is taken out and forged, and replaced by another.



# Putting the Question Mark to Work

— 108 —

## Saving Acid in Pickling

*Do you know of an inhibitor for use in pickling mild steel sheets for galvanizing which will reduce the acid cost but not increase the "skinned" or "metally" effect on the galvanized sheets?*

Harold Edwards,  
Shotton, Chester, England.

ALL inhibitors are said to reduce the cost of acid in pickling. This is usually brought about by reducing the amount of metal dissolved from the base underneath the scale, thus avoiding the use of acid in the futile formation of ferrous sulphate. A perfect inhibitor would reduce the acid attack on the base metal to zero, but in so doing it would bring the pickling action to zero also. When our process of descaling is used, none of the base metal is dissolved and there is no unnecessary cost of acid. Your inquirer might consult L. P. W. Plating Plants, Ltd., Chase Estate, London, N. W. 10, England.

The Bullard Co.

— 109 —

## Wood Grain on Plastic Sheets

*Can you tell us how wood grain designs are transferred on to metal and plastic materials?*

Adler Metal Products Corpn.

OUR practice is not to transfer the wood grain designs directly to the plastic sheets. A photograph is taken of a desirable sample of wood and this is then transferred to a regular photogravure roll. From this roll, sheets of paper are printed in the ordinary way. These sheets are then used as top sheets in the build-up of our regular laminated plastic sheets. It simply means that two or three of these printed sheets replace the natural or black color sheets which would be regularly used for insulating grades. We usually have to use two or three of the printed sheets in order to maintain the finish against the background of filler sheets. It is necessary to use the same type of paper as the printed sheets on the opposite side of the plastic sheet in order to avoid any strains which might cause warpage.

H. D. R.

— 110 —

## Aluminum and Beryllium

*Are there any satisfactory aluminum-beryllium alloys and are such alloys feasible for castings?*

G. B. L.

ALUMINUM does alloy satisfactorily with beryllium, but as yet we have no commercial aluminum-beryllium alloys.

Aluminum Co. of America.

510—The Iron Age, March 30, 1933

▲▲▲

## Tungsten Carbide

WHO makes tungsten carbide and similar hard-tipped tools? Can you give directions for brazing tungsten carbide to steel tools? Is the use of tungsten carbide tools practical for the small shop? These are typical of the many questions about tungsten carbide which are being received and answered in this department. If you want to know how others may have solved your problem, write about it to the Forum Editor, Iron Age Publishing Co., 239 West 39th St., New York City.

▼▼▼

— 111 —

## Depth of Nitriding Case

*How deep a case should we secure in 24 hr. on nitridable steel intended for general use?*

N. H. B.

THE true case depth as determined by hardness depth curve is about 20 per cent greater than that shown by fracture. Using a nitralloy G steel we secure in 24 hr. at 975 deg. F. a case depth of 0.012 in. as shown by fracture with a Vickers diamond hardness of 900. On the same material in 48 hr. under the same conditions we get a case depth of 0.02 in. with a Vickers diamond hardness of 1000.

American Chain Co.

— 112 —

## Use of Beryllium

*I have noticed reference to the use of beryllium in the development of several new alloys. Can you tell me where I can find out more about beryllium, its manufacture and use?*

H. L. Rutchick.

THE following concerns are in position to give considerable information concerning beryllium and beryllium alloys:

American Brass Co., Waterbury, Conn.,  
Beryllium Products Corpn., New York,  
Ampco Metal, Inc., Milwaukee.

S. R. W.

— 113 —

## Fuel for Annealing

*Can you tell me how much fuel oil I should use in annealing wire varying in size but all under 1/4 in. in diameter?*

C. R.

SO much depends upon the design of furnace, the grade of oil, type of burner, and the thickness of wire that it is impossible to give any definite answer. We feel that under especially good conditions a manufacturer might be expected to have a fuel oil consumption of 15 gal. per ton of wire annealed.

Lukens Steel Co.

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## Gamma Ray Examination

*Does the Government furnish radium for gamma ray examination of materials?*

J. T. S.

SOME time ago the Bureau of Engineering and Construction and Repair acquired 485 milligrams of radium in the form of anhydrous radium barium sulphate to be used principally for making radiographic examination of steel castings intended for Naval use. This radium was obtained in silver capsules in weights varying from 25 milligrams to 180 milligrams each and is used for gamma ray examination of important castings and in cases where rejected castings may be further explored.

We offer the use of this radium to manufacturers of castings for the Navy and also to those who, from their position in industry, are prospective suppliers of Navy castings. In such cases the Government furnishes the radium free, but the manufacturer pays all the expenses of two men while away from the Naval Research Laboratory and other costs in connection with the work. The bureau has no definite information about private firms which might give radium inspection service to companies, but it is suggested that the St. John X-Ray Service Corpn., New York, or Dr. R. F. Mehl, director of metallurgical research, Carnegie Institute of Technology, may give such information.

Bureau of Construction and Repair,  
Navy Department.

— 115 —

## Supporting Welded Pipe

*Have you any information on the strength of flanges of wrought iron pipe for supporting spans?*

K. W. P.

A DEFINITE case may be of some help. We have used a 24-in. diameter wrought iron pipe made of 3/4-in. wrought iron plates electrically welded and used with extra heavy flange connections. This pipe line is supported by cast iron brackets on the side of a concrete highway bridge. The bridge has clear spans of 40 ft. so that the pipe spans are approximately 50 ft. Pipe lengths were arranged so that every other pipe was supported on one of the brackets. This left two flange joints at approximately one-third the span. Expansion joints were used on either end of the bridge where connection was made to a 36-in. main feeder line anchored to the concrete abutments.

E. E. M.



# Progressive Die Used on Dieing Machine Doubles Output of Cartridge Links

ONE man operating a press equipped with a progressive die now makes 50,000 machine-gun cartridge links a day whereas five men, under previous practice, had made approximately 25,000 links a day. Speed of production, coupled with close accuracy, has long been an objective in the manufacture of these intricate 30-calibre links, which are used in the belts which feed cartridges to the Browning machine gun. These progressive dies were engineered and built by the Quality Hardware & Machine Corp., Chicago, and the design and application to the dieing machine were the result of co-operation between the Henry & Wright Mfg. Co., Hartford, Conn., and the Rock Island (Ill.) Arsenal of the Ordnance Department.

Until recently these links were produced in five separate punch press operations on five presses. In four of the five operations the parts were fed by hand and there was a heavy loss by rejection because of misalignment of parts in the dies. Production of 60 links a minute was exceptional and, as previously stated, five men could produce only 25,000 links in a day. With one man now producing 50,000 links a day the labor saving is about ten to one.

One Henry & Wright dieing machine of 50-ton capacity is now employed. The links are made from an-

nealed coiled spring steel, 1 5/16 in. wide and 0.025 in. thick, having a Rockwell B scale hardness of 80-82. The machine is equipped with an automatic double-roll feeder and a scrap cutter.

The progressive die steps are as follows: In the first operation the pilot holes are pierced. In the second operation the contour of the piece is sheared, the center hole is blanked and, at the back end of the two legs, tabs are formed. These tabs serve to carry the piece in the scrap through the various progressive die operations.

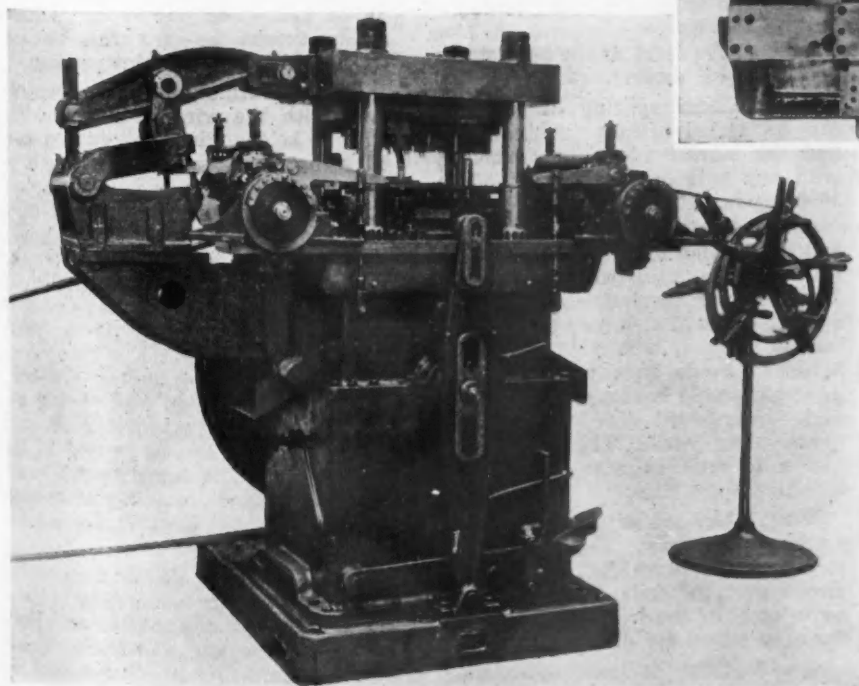
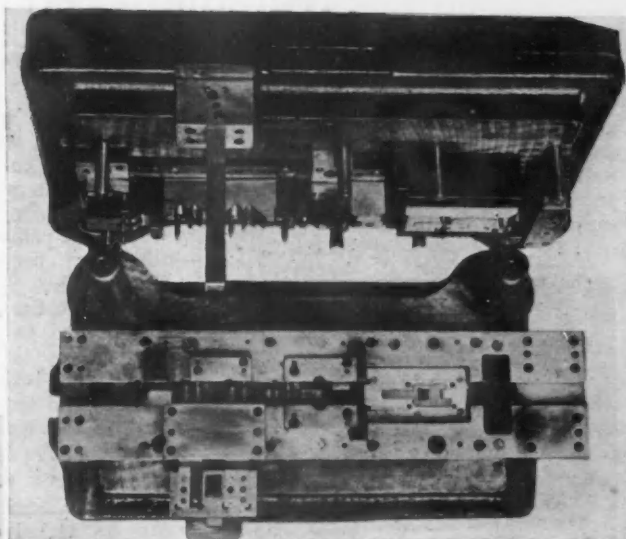
The outline and shear are completed at the third operation and in the fourth operation, or station, the ends of the legs and center sections are

formed. At the next, or fifth operation, the legs are formed up to an angle of 45 deg., preparatory to the first curling operation. The first complete curl over a set of cam-actuated mandrels is performed at the sixth operation and at the seventh operation the curls are restruck and sized over a second set of mandrels. These mandrels are mounted on a common block with the mandrels at station six. The block is actuated by a cam mounted on the punch holder.

A spacer block is mounted at the seventh station in order to assure parallelism of the curled section. At the last station, the eighth operation, the cut-off punch shears the tabs. Quick release of the piece part after the cut-off is essential in order not

**THIS** progressive die performs eight operations. The press is operated at 100 strokes per minute, producing a finished link at each stroke!

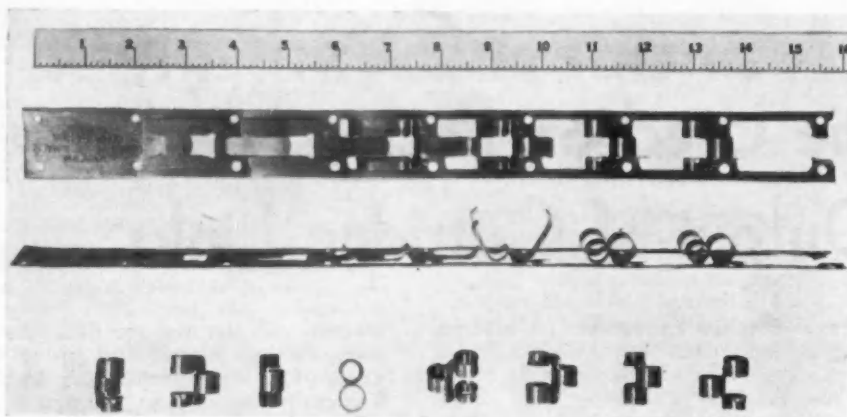
**CARTRIDGE** links are made on a 50-ton dieing machine fitted with an automatic double roll feed and a scrap cutter.



to distort the link. The scrap is spread slightly by insertion of a spreader block. Finished parts are carried down through the die and out of the machine. The cutter shears the scrap in the same lengths as the feed cycle. The press is operated at a speed of 100 strokes a minute, a finished link being produced at each stroke of the machine.

The following tolerances serve to indicate the importance of accuracy, and also stress the accomplishment in so far as speed of production is concerned. The inside diameter of one curled leg is held to minus 0.002 to 0.003 in. because of maintaining extractor pull of 5 to 10 lb. on the cartridge. Other dimensions are held either to a plus or to a minus 0.005





Links made from annealed spring steel coiled stock, 0.025-in. thick and 15/16-in. wide, are produced at the rate of 50,000 a day.

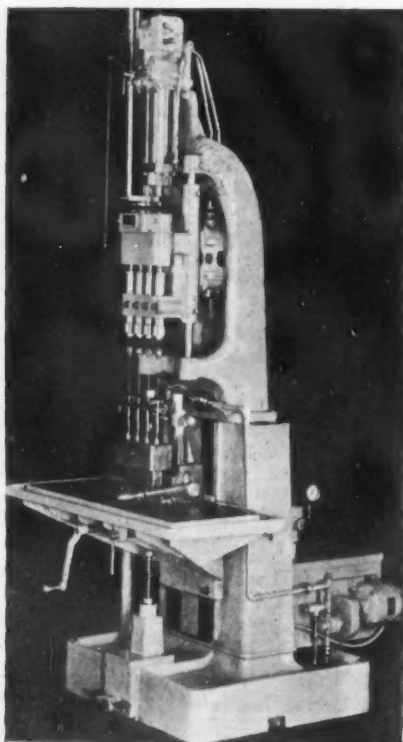
in., never to a plus or to a minus.

Success on this job is contingent not alone on successfully designing and building an accurate and rugged progressive die but also upon the use of press equipment of ample rigidity and accuracy to assure the main-

tenance of perfect parallelism between the punch carrying member and the die bed. Adjustment of the guide rod bushings permits take-up of 0.0003 in. on the inside diameter of the bushings. Further, no angular thrust is transferred to the upper cross head.

## Step Drilling Machine with Hydraulic Feed

FOR deep drilling of small holes, the Chas. G. Allen Co., Barre, Mass., has placed on the market the step drilling machine here shown, the spindle-slide of which carries four ball-bearing spindles and is arranged with hydraulic feed. Each unit has capacity for drilling four 1/4-in. holes



Capacity is for drilling four 1/4-in. holes 8-in. deep.

8-in. deep. Two or more units can be mounted on the same base.

The drills are advanced at high speed to the work, then changed automatically to fine feed, and after drilling to a predetermined depth of step they are withdrawn from the work and returned at high speed to the point previously drilled. They then go into fine feed again, and so on through the cycle. When the holes are drilled to full depth, the slide returns to its highest position and stops. The operator then reloads the fixture, and starts the cycle again by pulling the pendant handle. A foot treadle at the front of the base starts and stops all motors.

Number and spacing of spindles can be varied to suit requirements, and the machines can be furnished with any spindle speed from 750 to 3000 r.p.m. The spindle motor is mounted directly on the spindle-slide, and the tension of its V-type driving belt may be adjusted conveniently. The feed per revolution of the drill and the depth of step may be adjusted readily. The spindle slide travels on hardened guide bars with standard interchangeable hardened bushings at each corner of the slide, which is adequately lubricated. The ram of the hydraulic feed cylinder is fastened directly to the slide.

Work tables are adjustable through a telescoping screw. This adjustment in conjunction with that of the slide stroke and the independent vertical adjustment of the drill spindles makes for easy set-up for different jobs.

Specifications include: Maximum

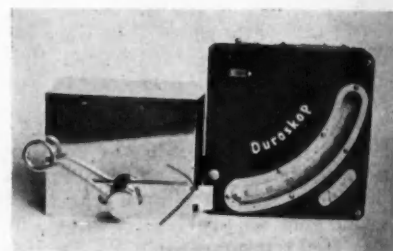
stroke of spindle slide, 9 in.; independent vertical adjustment to spindles, 2 1/2 in.; vertical movement of table on column, 15 1/4 in.; maximum distance chuck to table, 28 in.; and chuck capacity, 3/8 in. The machine with one drilling unit occupies floor space of 42 x 49 in., and the height, overall, is 7 ft. 10 in.

In drilling a 5/32-in. diameter, 4 1/4-in. deep hole in armature shafts for fractional horsepower motors, the machine illustrated produces at the rate of 120 shafts an hour.

## Duroskop Adapted for Wire Hardness Testing

A SPECIAL form of the Duroskop portable hardness testing instrument, described in THE IRON AGE of Dec. 24, 1931, is being offered by the R. Y. Ferner Co., Investment Building, Washington, for testing wire and other small cylindrical material.

In this instrument hardness is measured by the angle of rebound of a falling pendulum. For testing wire the usual spherical anvil of



In this portable instrument, which weighs only 13 oz., hardness is measured by the rebound of a falling pendulum.

the hammer head of the pendulum is replaced with a cylindrical anvil the axis of which is parallel to the pendulum rod. The side of the cylinder strikes across the wire when the latter is held in a horizontal position.

Rapid routine tests are possible, even with the wire in motion. The wire is held against the curved face of a hardened steel block, such as shown. This block, which is chromium-plated, has one end curved on a radius of 3 3/4 in., while the opposite end is flat and is suitable for testing straight material, such as drill rod. Two adjustable supports for the wire or rod are provided; these have notches for holding the wire against the curved surface during the test. For wire to be tested while being unreeled, holes can be provided through which the wire can be passed at the proper level. The supports can be reversed or inverted for use at the opposite end of the block or for special forms of material.

The instrument itself is contained in a case 4 1/8-in. square by 1 1/4-in. thick, and it weighs only 13 oz. Both settings and tests can be made quickly and readings readily estimated to



fifths or tenths of a degree. Wires as small as 0.004 in. and cylindrical objects as large as 2 in. in diameter can be tested. Black wire can be polished at the point of test or the difference between the readings on the black surface and the polished surface can be determined and applied as a correction. Tinned wire or wire thinly coated with zinc gives the same results as if there were no coating, but hot zinced wire must be cleaned at the test point.

It is stated that because of its speed, the Durosok is especially use-

ful in checking the homogeneity of wire. In such tests the wire is moved along about 0.05 in. after each test and the successive readings plotted on cross-section paper. From a study of the variations of the curve one can judge the degree of uniformity of the material. This test, it is stated, may save much useless working of poor material. Suitability of material for rivets can also be tested, as well as the suitability of wire for drawing, coating, hard drawing, for nail heads, etc. The instrument can also be used for testing the hardness of steel balls.

equipment with suitable horn produces the Gordon or compound side seam.

Safe operation, as well as flexibility and efficient performance, is emphasized. The horn, a steel forging, supported at both ends, permits side seaming relatively small diameters. It is located at a convenient height so that the operator may have unobstructed view of the tools. The swinging latch that supports one end of the horn must be in the closed position before the press can be tripped. Interlocking treadle and single-stroke attachment are available for clutch control. These safety features, which preclude working of the slide until the drum body is in correct position, make for efficient handling of the work.

The press frame is of tie rod construction, with four steel tie rods

## Threading Machines with Selective Speed Gear Box

**P**RODUCTION is increased and life of chasers between grinds prolonged by the wide speed range provided by the new selective speed gear box developed by the Landis Machine Co., Waynesboro, Pa., for its motor-driven 2-in. pipe threading and cutting machine, 2-in. pipe and nipple threading machine and 2-in. and 2½-in. bolt threading machines. This gear box, shown herewith, applied to the pipe threading and cutting machine, has eight speeds, which makes possible the selection of a threading speed more exactly suited to the diameter of the work and the machinability of the material to be threaded.

Speed changes are effected through self-locking levers which are conveniently located. The lever positions for the various speeds are indicated by a speed plate attached to the gear box cover.

This unit is self-contained and is completely inclosed. All gears are cut from chrome-nickel steel and are hardened and burnished. Gear shafting, made of heat-treated alloy steel, is mounted on anti-friction bearings. Both gears and bearings are splash lubricated by oil contained in the reservoir formed by the lower portion of the gear case.

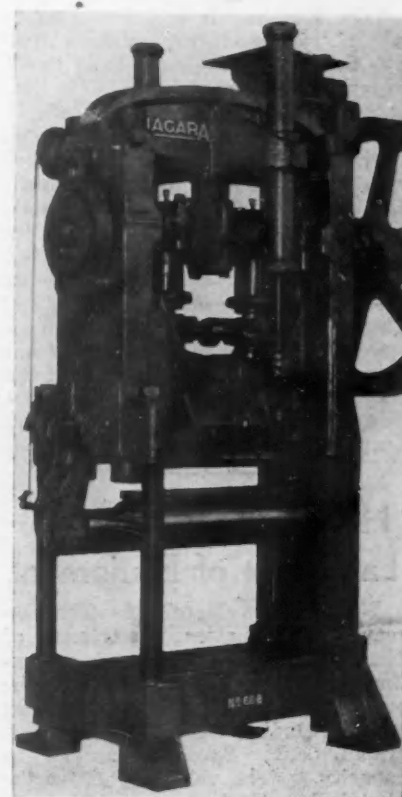
Being self-contained, the gear box unit may be readily applied to the

sizes and types of machines enumerated, including those now in service. It can be bolted to the headstock in the same position as the tumbler gear box or the speed reducing plate used as standard equipment on the constant-speed and variable-speed motor driven machines, respectively.

## Horn Press for Side Seaming Metal Drums

**D**RUM body shells of uniform diameter at both ends, with side seams tightly closed throughout their entire length, are said to be produced at minimum cost on the double-crank horn press illustrated, which has been built by the Niagara Machine & Tool Works, Buffalo, N. Y., for side seaming metal drums.

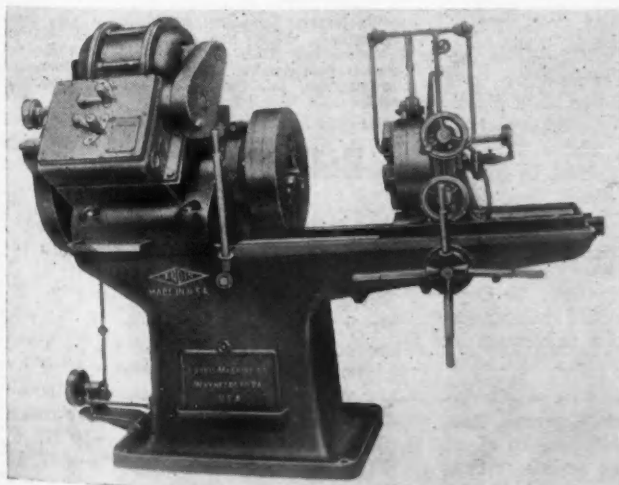
The machine shown is equipped with a duplex side seaming horn for making hooks and closing the side seam of drum bodies. The adjacent edges of body cylinders are folded, one up and one down, in the first stroke of the press slide, and in a second stroke, the previously assembled hooked edges are bumped together. The closing or bumping tool is designed for offsetting the seam either inside or outside. Similar



Crank press with duplex side-seaming horn for making hooks and closing the side seam of metal drum bodies.

shrunk in place. The two steel rods below, at the left, act as part of the housing and are spaced to provide clearance for the removal of the finished shell. Enclosed springs counterbalance the slide and minimize the duty on the clutch and brake.

Economy of lubrication in steel mill operations is discussed in the March number of *Lubrication*, published by the Texas Co., 135 East Forty-second Street, New York. Lubrication of overhead cranes, particularly the problem of loss by dripping and spotting of sheet steel products during handling, is also taken up.



WITH eight selective speed changes, a threading speed more suited to the size of work and the material is available.



## Appeal Filed in Suit Over Stainless Steel Patents

The American Stainless Steel Co., Pittsburgh, and the Electro Metallurgical Co., New York, have filed an appeal with the United States Circuit Court of Appeals at Baltimore in their infringement suit against the Rustless Iron Corp. of America. The lower court recently held the Clement patent on stainless iron, under which the suit was brought, to be invalid because of an earlier patent on similar material granted to Elwood Haynes. This opinion creates an interesting situation because the Haynes patent is also owned by the American Stainless Steel Co.

Thomas D. McCloskey, president, American Stainless Steel Co., says:

"The Rustless Iron Corp.'s process of manufacturing rustless iron was declared by the court to be in all material respects a duplication of that described by Hamilton and Evans in their process patent owned by the American Stainless Steel Co. and which is the other patent in suit. However, the Hamilton and Evans patent was held invalid because its essential features are said to be the same as those of an earlier patented process for producing ferrochromium. This portion of the lower court's opinion seems to affect adversely not only the process patent on which the suit was based but also the process being used by the Rustless Iron Corpn."

## Hoover Dam Calls For Large List of Equipment

WASHINGTON, March 28.—The Bureau of Reclamation, Department of the Interior, has prepared a preliminary list of purchases yet to be made for the Hoover dam and power plant, including electrical equipment, cranes, etc. Specifications as to capacity, weight, voltage, etc., for the electrical equipment are subject to change. Included in the list of turbines are five 115,000 hp. and two 55,000 hp. units with generators on which bids were opened March 10, the tenders including alternatives for furnishing or not furnishing butterfly valves. Some of the equipment will be purchased at an early date, while other purchases will extend over a period of years.

The list issued includes:

### Hydraulic Turbines

- 15 115,000-hp. vertical reaction type
- 2 55,000-hp. vertical reaction type
- 2 4200-hp. horizontal impulse type

### Generators

- 15 82,000-kva. vertical
- 2 40,000-kva. vertical
- 2 3000-kva. horizontal

### Transformers

Sixty-six, varying from 2300/115 to 13,800/287,500 volts.

Also 136 2300 to 287,500-volt oil circuit breakers.

### Cranes

- 4 300-ton overhead type
- 1 50-ton overhead type
- 4 20-ton overhead type
- 3 10-ton overhead type
- 1 100-ton gantry type
- 1 15-ton gantry type
- 4 20-ton overhead circular type
- 2 100-ton special type
- 2 5-ton gib type

### Elevators

- 2 4000-lb., 161-ft. lift, 6-ft. x 6-ft. cage
- 2 4000-lb., 530-ft. lift, 6-ft. x 8-ft. cage
- 2 4000-lb., 100-ft. lift, 8-ft. x 10-ft. cage

### Gates and Valves

- 8 100-ft. x 16-ft. drum gates
- 16 high-pressure slide gates
- 12 76-in. needle valves
- 12 84-in. needle valves
- 12 86-in. emergency gates
- 12 102-in. emergency gates
- 15 168-in. butterfly valves
- 2 120-in. butterfly valves
- 5 30-in. gate valves
- 32 14-ft. x 16-ft. draft tube stop gates
- 16 11-ft. x 16-ft. relief valve stop gates

Metal work such as steel stairs, walkways, floor gratings, roof trusses, transmission towers, piping, fittings, valves, operating apparatus for drum gates, butterfly valves, building materials, etc., also will be required.

## River Movement of Steel Gained in February

Movement of iron and steel products on the Ohio River in the Pittsburgh district during February amounted to 23,614 net tons, according to the United States Engineer office, Pittsburgh. This compares with 18,002 tons in the preceding month, and with 40,737 tons in February, 1932. On the Monongahela River steel shipments amounted to 17,904 tons in February, 11,734 tons in January, and 20,089 tons in February, 1932. Steel shipments on the Allegheny River totaled 1656 tons in February, compared with 1627 tons in the preceding month, and with 2200 tons in February, 1932.

## Two Scrap Freight Rates Reduced by I. C. C.

WASHINGTON, March 28.—The Interstate Commerce Commission has granted permission to the New York, New Haven & Hartford Railroad to reduce the rate on iron and steel scrap from the Providence district in Rhode Island to \$1.50 per gross ton. The present rate is \$2. The \$1.50 will apply to intermediate points also, some of which now take a rate of \$1.90. It is to go into effect 10 days after tariffs are filed and will cover carlot shipments with a minimum of 67,200 lb.

Shippers at the points of origin informed the New Haven Railroad that they would be in a position to start shipping to Boston and points within the Boston switching district if the

reduction were made. Otherwise they said they would move the shipments by motor trucks.

The Kansas City Southern Railroad has been given permission, upon 10 days' notice, to establish a rate \$1.40 per gross ton on old rails, carlots, 75,000 lb. minimum, from Lunita and Starks, La., to Lake Charles, La., Beaumont and Port Arthur, Tex., for export. The rate was sought in order to move 6000 tons of rails stored at the two points of origin, and will be continued for six months. Shippers offered to send the material by rail if the \$1.40 rate were established, but said that truck operators offered to ship at \$1 per ton.

## Trade Notes

Barber-Colman Co., Rockford, Ill., manufacturer of the Barcol overdoor and door operating equipment, is announcing a number of changes in sales territories. Distribution in northern Ohio is now centered in a branch office of Barber-Colman Co., at 3030 Euclid Avenue, Cleveland. B. R. Krause, Buffalo, N. Y., will cover a part of northern Pennsylvania as well as central and western New York. G. M. Mencke, Cincinnati, will handle additional territory in southern Ohio and northeastern Kentucky. The Barber-Colman branch office in Minneapolis adds a few counties in the southeastern part of South Dakota. The northeast portion of New York state is covered from Barber-Colman's Massachusetts office at Framingham, Mass. John E. Figner Co., Pittsburgh, is a new distributor, who will cover a territory including western Pennsylvania, southeast Ohio, all of West Virginia and portions of Kentucky and Maryland.

Harnischfeger Corp., Milwaukee, has appointed Florandin Equipment Co., 40 West Fortieth Street, New York, as its welder representative in the metropolitan district of New York and northern New Jersey. Mr. Florandin has been connected with the welding industry for more than 20 years.

Chain Belt Co., Milwaukee, has appointed Keller Tractor & Equipment Co., Detroit, as distributor for Rex Construction Equipment.

Northern Equipment Co., Erie, Pa., has appointed J. W. Murphy Co., 431 South Dearborn Street, Chicago, as its representative in the Chicago district for Copes feed water regulators, differential valves, pump governors and similar equipment.

Ludlow Valve Mfg. Co., Troy, N. Y., has appointed J. W. Frasier Co., 626 Western Reserve Building, Cleveland, as its representative in northern Ohio.

American Cyanamid & Chemical Corp., 635 Fifth Avenue, New York, has obtained exclusive rights on all ores and pigments mined from the Mabelite deposit controlled by East-Tern Mabelite Corp., 225 Mercer Street, New York.

E. W. Buschman Co., Cincinnati, has been appointed general distributor in that district by Morse Chain Co., Ithaca, N. Y., for its line of power transmission chains, silent and roller types.

Patterson Foundry & Machine Co., East Liverpool, Ohio, has appointed the Skeldon Engineering Co., Toledo, Ohio, as district representative for the Toledo territory for its stokers, ash conveyors, cast iron storage tanks and soot blowers.

## Bullard Co. Meeting

Following the annual meeting of the Bullard Co., Bridgeport, Conn., March 15, the board of directors re-elected E. P. Bullard, president; E. C. Bullard, D. B. Bullard, and J. W. Bray, vice-presidents; A. E. North, secretary-treasurer; and G. L. Todd, assistant secretary-treasurer. The board of directors includes the president, vice-presidents, secretary-treasurer, and E. P. Blanchard, H. C. Bullard, J. W. C. Bullard, and T. E. Dunn.



# OFF THE ASSEMBLY LINE



## Detroit Ends Prolonged Bank Holiday; Automobile Output Slowly Gaining

DETROIT, March 27.

**N**OW that Detroit again has banking facilities worthy of its size and of its industrial importance, sentiment in the automobile industry is beginning to recover from the low state to which it had fallen with the coming of the national banking holiday. This city admittedly has been the sorest banking spot in the country. It is difficult to imagine the financial web in which industrial concerns, retail stores and individuals became tangled during the six weeks' local banking famine. There is scarcely an automotive executive who was not affected in both a business and personal way. The result is that the industry's outlook nationally has naturally been influenced by the pessimism which has engulfed Detroit. The quick support which the public has accorded the General Motors-sponsored National Bank of Detroit has already helped to dissipate this feeling, which it is believed will be replaced shortly by a mood of greater confidence.

Detroit has been seething with excitement the past few days because of last-minute outspoken opposition to the United States Treasury's plan for the new bank, which will take over the liquid assets of the two old institutions. The claim has been made that "Detroit is being sold out" to New York bankers and that the offset method whereby deposits are offset against loans in paying depositors in the defunct First National Bank-Detroit and the Guardian National Bank of Commerce will bring an avalanche of receiverships for Michigan companies caught in the debacle. The truth is that General Motors has helped the Government end a helpless deadlock among conflicting interests which was making it increasingly difficult for motor car companies and parts makers to keep running because of the complete and prolonged breakdown of Detroit's banking system. General Motors has no desire to enter the banking business on a permanent basis, but will offer

the new bank's stock to the depositors and stockholders of the old banks at cost, making the bank a community institution.

### Old Banks Cannot Carry On

Speaking for the Roosevelt administration, Jesse H. Jones, director of the Reconstruction Finance Corp., stated Friday night, "Candor compels me to say that losses in both of these banks (the old banks) extend far beyond their capital structures, and neither of them can be permitted to carry on as sound banks. It is also clear that any other course than is being pursued would cause greater loss to depositors and stockholders." This is considered the Government's final answer to those critics who think that the city's industries would be better served by operating the old banks under conservators instead of substituting for them a new bank.

The vital importance of the best possible solution of the banking situation to all of Michigan's industries, including scores of metal-working companies, can scarcely be realized unless one knows that the first National Bank-Detroit had over 700,000 depositors, the largest number of all the banks in the United States, that the Guardian National Bank of Commerce had another 100,000, and that these institutions still are holding millions of dollars of reserves belonging to small outstate banks, most of which cannot open until these funds are released. It is intimated at Washington that the new administration may reverse the Hoover ruling against regarding these deposits as having preference over other deposits. It is reported that within another week the new bank will have bought the assets of the old banks and will be able to pay out 40 per cent immediately in addition to the two 5 per cents which already have been paid. Michigan's retail and manufacturing activities are expected to turn upward as soon as this major payment is made.

There are signs of a slow but

steady recovery in motor car production. Briggs and Murray have speeded up body output, the former having worked six days last week on Ford orders at its Highland Park plant. Steel purchases at Dearborn have included bars, strip steel and sheets as well as a small quantity of front axle forging billets.

Briggs and Murray are supplying over 1000 bodies a day to Ford. Ford's car assemblies are reported to be 1200 to 1400 cars daily. The steel trade is expecting additional orders from the Ford company this week.

Machinery builders are proceeding with the task of completing machine tool orders for the tooling up of the small V-eight, but it is believed that no steel has been bought for it aside possibly from minor tonnages with which to try out dies.

### Chevrolet to Increase Schedule

Chevrolet operated its local plants three days last week, and will increase the schedule to four days this week. Its Saginaw foundry thus far has run eight days this month. Because of the high operating rate in January and February and the unexpected interruption of activities this month, Chevrolet is estimated to have on hand or already made up into stocks built ahead enough steel for 25,000 cars, while steel mills are holding a like tonnage, most of which has already been rolled, awaiting shipping releases. This is about equivalent to a month's supply. The steel trade therefore is not looking for much Chevrolet business for at least two weeks. Chevrolet is said to have allotted its second quarter's steel requirements among its old suppliers in approximately the same proportion which has prevailed recently. Chevrolet's production is irregular, but will expand slowly as retail sales increase. Its April manufacturing program is yet to be determined.

Cadillac is turning out about 100 cars a week. Incidentally its production, formerly calling for separate motor assemblies for each car, has



been consolidated into two lines. Cadillac and LaSalle eights are coming off one line and Cadillac twelves and sixteens off a second line. Pontiac and Oldsmobile have resumed at a fair rate, but Buick is very slow. Plymouth and Dodge are back on a four-day-a-week basis. Packard, Hupmobile, Reo and Auburn are all active on a greatly restricted basis. On Wednesday Studebaker began work in its body division and in a few other departments at South Bend and by today expects to have 3500 men employed. It has on hand orders for about 1500 cars. The Studebaker receivership has been extended to its subsidiary, Rockne Motors Corp. of Detroit.

#### Retail Orders Eagerly Scanned

Sales executives are anxiously scanning retail orders for the latter part of this month as they come in from dealers, believing that from them they can obtain some clue regarding the public's attitude toward spending its money, now that banking facilities are being rapidly restored. If there is any indication of a loosening of tightly held pocketbooks, advertising and sales promotional expenditures in the next month are likely to be revised upward considerably. At least two companies, Chevrolet and Hudson-Essex, are definitely planning

on a big sales push in April in an attempt to get whatever seasonal business appears. One of the large automobile companies which heretofore has planned its advertising and sales promotional campaigns on a long-term basis, has just adopted a policy of setting up a month-to-month program.

Realizing that the automobile industry cannot prosper unless its suppliers get a fair price for their products, one of the most important manufacturers is adhering to a "live and let live" policy. It is definitely discouraging steel mills from entering into destructive competition for its business, going so far as to refuse to give orders to two companies which cut quotations considerably under those made by its regular sources of supply. Unfortunately this fair-minded attitude does not extend far beyond the purchasing offices of this company, for its leading competitor is reported to be bearing down hard in an attempt to get concessions. Incidentally steel companies are holding firm in their resolve not to sell beyond the second quarter. Pig iron users are asking for extension of present prices over the remainder of the year. Furnace interests, however, will not book orders beyond the third quarter.

roads themselves would benefit through cuts in rates, thereby getting more traffic and preventing the diversion of tonnage to competitive transportation lines. Industries of the country, it was argued, are being subjected to higher rates than they can bear and must have immediate relief.

Among those making these points were coal, lumber, agricultural and cement interests, who presented the petition for reduced rates, and others. Included among the latter were G. H. Staat, Interlake Iron Corp.; R. C. Allen, Lake Superior Iron Ore Corp., and J. P. Hannan, Corrigan, McKinney Steel Co.

The railroad interests contended that they could not reduce rates in the face of high deficits which already are being experienced. They maintained there was no evidence that lower rates would bring more traffic or aid industry. It was also argued that the commission had no power to make a general reduction in rates.

### Steel Corporation to Cut Salaries 10 Per Cent

The United States Steel Corp. will put into effect an additional 10 per cent cut for all salaried workers beginning April 1, but has taken no action on wages. Salaried employees will take off two days a month without pay. This is the third cut in salaries of Steel Corporation employees during the depression. One of 10 per cent took effect in September, 1931, and another of 15 per cent in May, 1932, at which time corresponding reductions in wages were made. This action of the Steel Corporation may not influence similar reductions by independent steel companies, most of which have already cut salaries from 30 to 40 per cent, or have brought about the same result through "time off" arrangements.

### Canadian Steel Output Off Sharply in February

Canadian production of iron and steel declined sharply in February. Banking of the only two active Canadian stacks in that month accounted for a decrease in pig iron output to 6144 tons from 29,209 tons in January. A decline in steel ingot and castings production to 12,374 tons in February from 40,766 tons in the preceding period occurred entirely in ingots made for further use of producers, a small increase having occurred in direct steel castings made for sale.

February production figures and comparisons follow:

	Feb. 1933	Jan. 1933	Feb. 1932
Pig iron.....	6,144	29,209	10,507
Steel ingots and direct steel castings.	12,374	40,766	28,489
Ferroalloys .....	1,076	1,217	1,481

### R. F. C. Grants Loans to Several Communities

WASHINGTON, March 28—Fair-sized tonnages of reinforcing bars will be required for improvements to be made to the Jones Beach State Park serving the metropolitan area of New York as the result of a Reconstruction Finance Corporation loan of \$5,050,000 announced last week. Included in improvements to be made over the next two years are the following: Construction of the Meadowbrook causeway across Great South Bay, to be about five miles long with 44-ft. bituminous macadam pavement; 2.7-mile, 40-ft. reinforced concrete pavement; 17 acres of reinforced concrete parking fields; repaving of approximately 3.1 miles of causeway with 40-ft. wide reinforced concrete pavement and 2.5 miles of connecting loop to Long Beach from new Meadowbrook causeway, paved with macadam 44-ft. wide.

Loans to towns for improvement or building of waterworks system also will require cast iron pipe and other tonnages. Among them are the following, with amounts indicated of expenditures to be made for materials and quantities of latter where shown:

Tulsa, Okla., \$40,000, stockyards, chiefly lumber, with smaller amounts of roofing, hardware and concrete.

Thomasville, Ala., \$12,000, waterworks system improvement; 3520-ft. 6 and 8-in. cast iron pipe; 130-ft., 100,000-gal. elevated tank.

Marion, Ky., \$19,000; waterworks system; cast iron pipe and filter equipment.

Flemingsburg, Ky., \$41,000; waterworks system; three miles of 6-in. cast iron pipe and smaller quantities of smaller pipe; 100,000-gal. elevated storage tank, filters and pumping equipment.

Sulligent, Ala., \$38,000; four and one-half miles of 2 to 8-in. cast iron pipe; half-mile 1-in. galvanized pipe; 50,000-gal. elevated tank.

Owenton, Ky., \$65,000; 315 tons of cast iron pipe and castings; 3500-ft. copper service pipe; filter equipment, pumps and 75,000-gal. elevated tank.

Greensburg, Ky., \$23,800; 36,000-gal. steel settling tank, two steel filter units, 150,000-gal. steel storage tank; about four miles of 2, 6 and 8-in. cast iron pipe.

Virginia, Ill., \$40,000; 60,000-gal. elevated steel storage tank and about six miles of 6 and 4-in. service mains.

### Freight Rates Too High, Shippers Contend

WASHINGTON, March 28.—In oral arguments heard last Friday and Saturday by the Interstate Commerce Commission on a petition of shippers for a general reduction in rates on basic commodities throughout the country, it was generally contended by shippers that industry is being retarded by high carrying charges. It was also maintained that the rail-



# Gray Iron Institute Reviews Progress in Technical and Other Activities

**T**ECHNICAL and other activities of the Gray Iron Institute were maintained and service to members was not curtailed the past year, although reductions in expenditures were made necessary. These facts were brought out at the association's annual meeting, held at the Hotel Cleveland, Cleveland, March 22. Various problems of interest to the gray iron industry were discussed during the meeting, which was divided into four sessions devoted to cost, technical subjects, merchandising and insurance. At noon a group luncheon was held.

A. E. Hageboeck, Frank Foundries Corp., Moline, Ill., was reelected president for the following year. J. H. Bruce, Bowler Foundry & Machine Co., Cleveland, was named vice-president, succeeding J. L. Carter, Newark, N. J. E. B. Sherwin, Chicago Hardware Foundry Co., North Chicago, Ill., was elected second vice-president. R. D. Phelps, Francis & Nygren Foundry Co., Chicago, was named treasurer, and H. C. Wilson, Cleveland Cooperative Stove Co., Cleveland, assistant treasurer, both being reelected.

New directors elected for three years were: J. D. Coltman, Bullard Machine Tool Co., Bridgeport, Conn., William T. Mellow, Liberty Foundry Co., St. Louis, H. P. Spilker, Sterritt-Thompson Foundry Co., Pittsburgh, and A. C. Ziebell, Universal Foundry Co., Oshkosh, Wis.

## Importance of Research Stressed

A brief review of the work accomplished since the association was formed five years ago was made by Mr. Hageboeck. He urged the importance of a definite program and individual contacts by the manager with members in order to obtain their views for transmission to the board as to work that should be undertaken. B. H. Johnson, R. J. Wood & Co., Philadelphia, past president, stressed the importance of research and development work, mentioning in this connection that the manufacture of automobile cam and crankshafts of cast iron and various other new cast products was the result of development work.

An increase in members and the formation of more local chapters was urged by Arthur J. Tuscany, manager, who declared that there is keen competition ahead from other fields, that institute activities must not be curtailed and that the opportunities of the gray iron industry are brighter than ever before. The association, he said, has succeeded in persuading some manufacturing companies to abandon plans to put in foundries and

to continue to buy their castings from outside sources.

## New Specifications Commended

The technical session opened with a review of work of the technical committee, with particular reference to the new specifications A48-32T for gray iron castings now in force, which was presented by Mr. Coltman, whose topic was "The Forward March of Gray Iron." The preparation of test specimens, he said, had been recommended with a view of establishing correct classifications, the influence and relation of test bars to standards, the elevation of the standards of gray iron and the certification plan. The third factor, elevating the standards of gray iron, he said, was accomplished in the same specifications by introducing the physical properties and ranges which were found by actual survey of the products of members. This work, he declared, was the most decided advance of gray iron toward a position of respect in the eyes of the engineering profession in over 20 years. Rapid progress in extending possible uses for gray iron and establishing operating and testing standards, he said, has opened new fields for gray iron.

Discussing the new specifications from the foundry viewpoint, Mr. Ziebell urged the need of raising and improving standards. Foundries, today, he said, are also interested in reducing scrap piles, production costs, better supervision, reduction of waste and increase in safety. He suggested that standards for machineability be improved and said that heat resistance and wear resistance in castings are factors in broadening the market of gray iron castings. Discussing the specifications from the buyer's viewpoint, minor changes were suggested by W. W. MacMillen, National Malleable & Steel Castings Co., Cleveland, chairman of the Iron and Steel Committee of the National Association of Purchasing Agents. The new specifications are useful to foundries and they should have the properties on their fingertips to pass along to their customers and thus assist in selling castings, declared W. W. Kerlin, metallurgist of the institute.

A report on physical properties of gray iron for light structures was prepared by Mr. Sherwin of the light gray iron sub-committee and was read by Walter Seelbach, Forest City Foundries Co., Cleveland. This committee was appointed to investigate the physical properties of typical light castings, because it was felt that properties other than tensile strength become more important as sections become thinner. Among these qualities

are surface qualities, rigidity and damping capacity. Seven test pieces are selected after an investigation of the proper design for test bars, gating and apparatus for testing. Surface quality, the report stated, is important, but hard to standardize. The committee recommended that a different set of standards be provided for surface quality of light castings than is used for heavy castings.

## What Damping Tests Show

Interest was shown in recently announced developments in tests for damping capacity. Rigidity and damping qualities were considered of importance when gray iron castings are being compared with stampings, for example. Most gray iron consumers, the report stated, suppose that the superiority of gray iron is merely due to its greater weight. This, however, is only partly true, as recent experiments show that the efficiency of gray iron in damping vibration regardless of weight is 12 times as great as steel and 20 times as great as aluminum. In the discussion, Mr. Coltman stated that there is less vibration in low-carbon iron than in that having a higher carbon content. Mr. Tuscany expressed the opinion that damping tests offered a real opportunity both for engineers and salesmen.

Need of machineability tests for light gray iron was emphasized by some of the members, and the feeling was expressed that separate machineability standards should be adopted. It was suggested that makers of cutting tools be asked to cooperate with the institute in developing machineability tests.

## New Uses for Gray Iron

In discussing new uses for gray iron, Mr. Tuscany declared that if the industry expects to survive it must give attention to improving the quality of its products and that this will lead to new uses. He suggested surveys by foundries of possible new markets and held that gray iron should be sold as engineering material. Among recent new uses for gray iron castings he mentioned rings for manholes, blast plates for locomotives, road surfacing material, railroad crossings, roofing material, chromium-plated kitchenware, enameled wall tile, brake drums and air conditioning equipment.

The cost session opened with a discussion of the relation of uniform costing to profits of individual members by A. C. Denison, Fulton Foundry & Machine Co., Cleveland. He emphasized the importance of the use of fundamental estimates in figuring costs as a means of eliminating cut-throat prices. Many foundries, he said, will do their estimating honestly but will have a wide range in cost estimates. In his opinion, many cut-throat prices are honest prices obtained by the freak use of fundamental cost data. The trouble, he



said, is due to the lack of use of standard procedure in figuring costs.

#### Costs Standards Emphasized

A paper entitled "Why Industry Standards," by P. E. Rentschler, president, Hamilton Foundry & Machine Co., Hamilton, Ohio, was read by A. E. Grover, cost director of the institute. The author urged the necessity of having cost standards for an industry so that a plant can compare its costs with those of other plants employing similar methods. A list of possible standard activities in a foundry was given, such as melting, core making, molding, etc., to which, the author said, additions could be made. Mr. Grover presented an interesting cost display, including castings and charts that showed wide variations obtained by various methods of figuring costs.

An interesting paper on costs was prepared by Mr. Carter, the vice-president, his subject being "The Institute Cost Program as a Means of Reducing Price Cutting." This paper was read by W. G. Grede, Liberty Foundry, Inc., Wauwatosa, Wis. The author stressed the need of reducing the evils of price cutting by having a simple uniform cost system and advocated that the best way of stabilizing costs is by the formation of local cost groups. He held that with a group cost consultant a foundry will learn if there is a discrepancy in its costs as compared with other foundries in the group and that thus great savings can be effected. The use of a group cost consultant has proved an effective method in some districts in reducing some items of costs, and he urged that the group cost finding system be extended to other groups of foundrymen.

### Illinois Steel Co. Ships Plates to Hoover Dam

WASHINGTON, March 28.—The Illinois Steel Co. has begun shipments from Gary, Ind., of about 45,000 tons of plates and shapes to the new fabrication plant of the Babcock & Wilcox Co. at Bechtel, Nev., which will construct, for the Hoover dam, pipe larger than any heretofore made. The pipe, to be made of fusion welded plate for the hydraulic power and outlet work tunnels, will be 30 ft., 25 ft., 13 ft. and 8½ ft. in diameter. The largest plates being shipped are 12 ft. wide and about 32 ft. long. These plates weigh 23 tons each and two are all that can be shipped on one railroad car. The plates have thicknesses ranging from 2¼ in. to 1 in.

The fabrication plant now has been fully equipped and in some respects is unlike any other in the country. One of its features is a huge oven in which the large pipe will be annealed.

## Stamped Plumbing Fixtures Open New Market for Sheet Steel

**A**N enameled sink made from a single piece of sheet steel and stamped into final form in 16 operations is a recent development of the Briggs Mfg. Co., Detroit, which has spent a year and a half in perfecting it and approximately \$90,000 in die, tool and engineering cost.

Most enameled sinks now being manufactured are of cast iron. Compared with them, the steel sink, it is claimed, has many advantages, including a lower retail price, less weight, greater durability and ease of installation.

Design is only one phase of the problem which has been solved. A steel containing unusual properties, special dies and tools and an improved enamel coating have contributed toward the perfection of the new product.

Sinks are made in two sizes, 43 in. and 60 in. The former is stamped from a 14-gage Armco crystal-etched enameling sheet 48 x 64 in., and the latter from a sheet 48 x 83 in. of like gage and quality. Fifteen presses are used for the 16 stamping operations, the presses ranging from several hundred tons' capacity up to 1500-ton toggle presses. The various dies aggregate 76 tons in weight. The finished 43-in. sink is 43 in. long and 22 in. wide with a skirt 8 in. deep and a backsplash 8 in. high. Except for greater length, the 60-in. sink has specifications similar to those for the 43-in. sink.

Whereas the steel sink weighs 50 lb., its cast iron counterpart weighs 190 lb. The shipping weight is 75 lb., compared with 280 lb. for cast iron. Weight advantages in the 60-in. sink are in relatively the same proportion as in the 43-in. product. The substantial saving in weight alone widens the market for steel sinks as they are

so designed that they can easily be erected by one man. Two brackets and several screws are the only necessary accessories.

Perhaps the best gage of the size of the market for ceramic plumbing fixtures is the fact that in 1930 domestic sales totaled \$129,000,000, this figure including other products as well as sinks. In 1931, a depression year, over 700,000 sinks were sold in the United States.

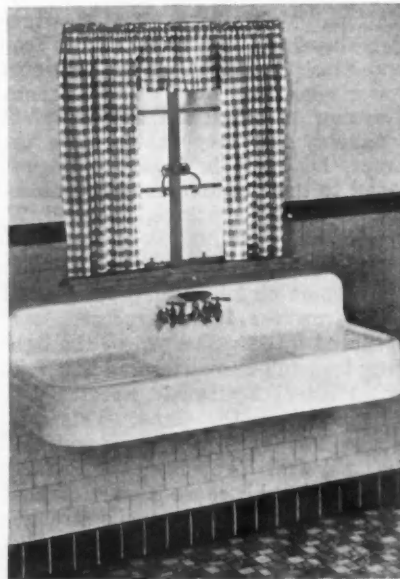
For the past two years the Briggs company, which for many years engaged exclusively in the production of automobile bodies and automobile stampings, has been diversifying its line of products. It now is turning out steel chairs, steel refrigerating cabinets and steel sinks, all of which are being marketed as "Brigsteel Products." The steel sink is the forerunner of other products which soon may follow in the ceramic plumbing fixture field. One of these will be a "non-skid" bathtub and another a lavatory. Both of these products will, it is claimed, be more durable and will weigh about 65 per cent less than those now on the market.

### Construction Institute Elects New Directors

The American Institute of Steel Construction, 200 Madison Avenue, New York, has increased the number of directors from 18 to 24, and has elected the following new directors: L. A. Paddock, American Bridge Co., Pittsburgh; Ralph J. Stayman, Jones & Laughlin Steel Corp., Pittsburgh; G. H. Blakeley, McClintic-Marshall Corp., Bethlehem, Pa.; Joseph A. Moore, Moore Dry Dock Co., San Francisco; C. Edwin Michael, Virginia Bridge & Iron Co., Roanoke, Va.; and J. F. Duthie, Wallace Bridge & Structural Steel Co., Seattle, Wash.

### National Acme Co. Moves Windsor, Vt., Plant

The National Acme Co. is moving its machine tool manufacturing plant from Windsor, Vt., to its main plant in Cleveland, where its line of automatic screw machines will hereafter be manufactured. The Cleveland plant for some time has been used for the manufacture of screw machine products and various special products. Charles W. Simpson, who was plant manager at Windsor, will serve in a similar capacity at the Cleveland plant and several key men at Windsor will also be given positions in the Cleveland plant.





# EDITORIAL COMMENT

## Beware of Greeks

RECENTLY this publication was solicited for an expression of opinion on the wisdom of cancelling war debts. The literature accompanying the request, although skillfully prepared, left no doubt that only one answer was wanted and that answer was duly given by a number of other business papers, as subsequent publicity disclosed.

THE IRON AGE refrained from replying to the questionnaire. Possibly with undue caution, we thought it well to beware of Greeks bearing gifts, the gift in this case being world economic recovery. We doubted the efficacy of a single cure-all in view of the complexity of world economic maladjustments and their intimate connection with political instability. Furthermore, we did not believe it the province of a business publication to embarrass its Government before entering negotiations that will be much broader in significance and much more intricate in details than is appreciated by those who have given only a cursory study to the debt problem. Finally, we felt that no part of the remaining indebtedness to this country should be shifted to the shoulders of American taxpayers without compensation more tangible and certain than the mere hope of economic recovery.

A Rip Van Winkle who had been asleep since the armistice might regard debt cancellation as our proper contribution to making the world safe for democracy. But the most casual observer of post-war events knows that the world has been moving steadily away from the democratic ideal and that international distrust and friction are more pronounced today than at any time since 1914.

To believe that wiping out debts would remove the causes of political disturbance abroad would be folly. On the contrary, by lightening the debt burdens of European nations we might remove the last hindrance to beligerent action. So long as European governments can afford to make political loans to their allies it is sophistry for them to contend that debt payments to this country are uneconomic. So long as nations can contemplate piling up a huge new debt structure to engage in another mass sacrifice of blood and substance, they are unconvincing in arguing their inability to pay existing obligations.

The United States gained nothing from the war except its creditor position. That position should not be lightly given up. It may yet prove a powerful influence not merely for the solution of economic problems but for the promotion of international political concord.

## Specifying Performance

SEVERAL years ago a steel furniture manufacturer had difficulty in securing material suitable for making electrically welded tubing. Experimental work was carried on in his research department and detailed specifications for steel strip were prepared, but in practice the strip did not weld properly. Finally he presented the problem frankly to the steel manufacturers. To his surprise he found that they preferred a practical statement of the requirements to the customary detailed chemical specifications. Accord-

ingly new specifications were prepared which merely stated that the material should perform satisfactorily under such and such conditions existing in the furniture manufacturer's plant. The full cooperation of the supplier of material was thus enlisted and the problem was soon solved.

Obviously this matter of specifying performance may be overdone, with the result that the over-all manufacturing cost will be increased. However, it seems likely that a better basis of cooperation is being developed between the user and supplier.

## Useful Life of Steel

IF the average life of steel be thirty years, then the amount of steel now in use is in round numbers 700,000,000 tons, this being approximately the aggregate of production of finished steel in the last thirty years, not allowing for exports and imports. Dr. George B. Waterhouse in his Howe memorial lecture before the American Institute of Mining and Metallurgical Engineers mentioned 750,000,000 tons as the estimate of the amount of steel doing service.

The return to the mills from year to year of a large portion of this used material makes up the bulk of the scrap remelted into new steel. Thirty years ago finished steel was being consumed at a rate of about 11,000,000 tons. Some such total would therefore appear as an outside figure of the supply of scrap currently available. It would support an output of 37,000,000 tons of ingots, made up of 55 per cent scrap; one-fourth of the tonnage would be scrap from the steel plant itself, leaving the 11,000,000 tons to come from the outside.

The consumption of finished steel for the years 1903 to 1907 inclusive was roughly 69,000,000 tons. If 70 per cent of this should prove recoverable, there would be a supply of 48,300,000 tons for conversion into steel, or enough, with the industry's own scrap, for a yearly ingot output of 32,000,000 tons. But the ingot tonnage of the last ten years has averaged nearly 40,000,000, so that with any approach to activity no greater than has obtained over all this period a scrap scarcity would be indicated. This finding is contrary to that discussed in this column on Sept. 1, last year. Then supplies of scrap seemed adequate, but the analysis was predicated on a useful life for steel of 25 years.

Should scrap continue to be collected in satisfactory amounts on an expansion in steel making to the levels of the 1920's, it will be clear that we shall have to conclude that the life of steel does not average as much as 30 years but is of the shorter term of 25 years. If more and more steel should be kept in use for longer periods of time, the relative scarcity of scrap will be reflected in the price and greater dependence will necessarily be had on pig iron. With a shortening of the life span of steel, the reverse situation will follow, and the favorable price of scrap will give added impetus to the present tendency to increase the scrap percentage in the open-hearth charges. The statistical position of scrap in recent years belies the estimates both of the 30-year useful life term and the 700,000,000 tons totality of steel in service.



# ... PERSONALS ...

JAMES LIPPINCOTT has been elected chairman of the board of the West Leechburg Steel Co., Pittsburgh, succeeding the late J. W. Kirkpatrick. Mr. Lippincott has been president of the company for many years. JAMES L. KIRKPATRICK has been named president, succeeding Mr. Lippincott. He is a brother of the late J. W. Kirkpatrick, and has been a vice-president and director of the company. MALCOLM W. LEECH, C. S. TODD and W. C. KIRKPATRICK continue as vice-presidents of the West Leechburg Steel Co., while GEORGE W. SHERIDAN remains secretary and treasurer.

♦ ♦ ♦

P. E. FLOYD has been appointed district sales manager in charge of the Chicago territory for the Ludlum Steel Co., Watervliet, N. Y. Prior to his recent appointment, Mr. Floyd acted in a similar capacity for the Associated Alloy Steel Co. He was Chicago manager for the Ludlum company prior to the formation of the Associated company.

♦ ♦ ♦

A. W. HENN, one of the founders and formerly president of the National Acme Co., retired as chairman of the board of that company at the annual meeting March 22 and was succeeded as chairman by F. H. CHAPIN, who continues as president, in which capacity he has served since 1926. Mr. Henn remains on the board of directors.

CUMMINGS C. CHESNEY, former vice-president of the General Electric Co. and manager of the Pittsfield, Mass., works, is president of the Berkshire Trust Co., Pittsfield, which opened this week.

♦ ♦ ♦

HENRY S. HOYT, member of the firm of A. Milne & Co., New York, has returned to the United States after an extended business trip in Europe. During his trip Mr. Hoyt visited many of the leading steel and iron mills in Sweden, Germany, Austria and Sheffield, England.

♦ ♦ ♦

FRED O. SMITH, vice-president of the Vulcan Iron Works, Wilkes-Barre, Pa., has been elected president of the Wilkes-Barre Iron Mfg. Co., Wilkes-Barre, Pa., maker of charcoal iron wheels, axles and car castings.

♦ ♦ ♦

RALPH E. FLANDERS, president, Jones & Lamson Machine Co., Springfield, Vt., will address a joint meeting of the Cleveland branch of the American Society of Mechanical Engineers and the Cleveland Engineering Society April 5 on "Present Day Economics."

♦ ♦ ♦

JAMES KNIVETON, formerly in charge of electric heat treating furnace design with Ryan, Scully & Co., Philadelphia, has joined the staff of the Ajax Electric Co., Inc., Philadelphia.

from Worcester Polytechnic Institute in 1899 and had been a vice-president since April, 1927. As vice-president, he was first associated with the management of the manufacturing department and later, in 1929, he was transferred to the engineering department, where he had charge of the designing engineering departments and of the works laboratories attached to each major manufacturing plant. Mr. Eveleth was works manager of the Schenectady works from 1923 to 1927.

♦ ♦ ♦

WILLIAM G. WATT, for many years secretary and treasurer of the Witherow Steel Corp., Pittsburgh, died at his home in San Diego, Cal., on March 15. He was a native of Pittsburgh and was identified with the Witherow organization from its formation in 1913 until 1929. Mr. Watt had lived in retirement since that time.

♦ ♦ ♦

D. F. H. McDOWELL, president of McDowell & Co., Pittsburgh, pipe jobbers, and also president of the Mercer Tube & Mfg. Co., Sharon, Pa., died at his home in Pittsburgh on March 25, aged 73 years. He was born in Clarion County, Pa., but had been located in Pittsburgh for the past 40 years, principally with the company bearing his name.

♦ ♦ ♦

WILLIAM S. THOMPSON, who retired as assistant to the president of the American Steel & Wire Co., Cleveland, two years ago, died at Evanston, Ill., March 25, aged 72 years. Mr. Thompson's first connection with the United States Steel Corp. was with the Illinois Steel Co. as a stenographer and private secretary in 1885. When W. P. Palmer became president of the American Steel & Wire Co. in 1900, Mr. Thompson went to Cleveland as Mr. Palmer's private secretary and later served under A. F. Keefe, who recently retired as president. A few years ago he was given the title of assistant to the president.

♦ ♦ ♦

JOSEPH EDWARD FISCHER, pioneer of the malleable iron industry of Wisconsin, died at his home in Beaver Dam, Wis., on March 19, aged 74 years. He was born in Berlin, Wis. From 1896 to 1920 he was general superintendent of the Western Malleables, Inc., Beaver Dam, following 13 years of service as superintendent of the Milwaukee Malleable Iron Co., Milwaukee, and four years as superintendent of the Belle City Malleable Iron Co., Racine, Wis.

♦ ♦ ♦

LOUIS W. SCHIMMEL, founder of the Detroit Gray Iron Foundry Co. and of the Detroit Alloy Steel Co., died in Providence Hospital, Detroit, after a long illness on March 12, aged 73 years. At the time of his death Mr. Schimmel was a director of the Detroit Gray Iron Foundry Co. and vice-president of the Detroit Alloy Steel Co.

## ... OBITUARY ...

THOMAS F. FERRY, who developed the now commonly used method of making cap screws by the cold upsetting



T. F. FERRY

process and who was president of the Ferry Cap & Set Screw Co., Cleveland, died March 22, aged 61 years. Mr. Ferry began his career as an apprentice in the plant of the Falls Rivet & Machine Co., Cuyahoga Falls, Ohio. Later he was connected with the Cleveland Automatic Machine Co., which he left to join the National Screw & Mfg. Co., Cleveland, by which he was employed for 17 years. While with this company he developed the cold upsetting process for making cap screws and formed the Ferry company to manufacture screws with the use of this process. He was a director and former president of the Associated Industries of Cleveland. A son, Edward W. Ferry, is secretary of the Ferry company.

♦ ♦ ♦

CHARLES EDWARD EVELETH, vice-president of the General Electric Co., died after a long illness at Schenectady, N. Y., on March 25, aged 57 years. He had been identified with the company since his graduation



## SUMMARY OF THE WEEK'S BUSINESS

# Steel Slow to Regain Lost Ground; Pittsburgh Scrap Advances

Ingot Output Estimated at 15 Per Cent, a Slight Rise—Pig Iron Buying Still Fairly Active—Good Scrap Scarce at Pittsburgh

STEEL production has risen to 15 per cent of the country's capacity from 14 per cent last week. The change is not indicative of any broad improvement in business, but rather is due to special circumstances. For example, the Wheeling district is operating at 30 per cent, a rise of five points, but this is mainly because of tin plate specifications, while at Cleveland a slight gain results from the desire of one company to build up a stock of ingots.

In the Pittsburgh district the mills are barely holding at last week's rate of 13 per cent, while operations in the Valley and contiguous territory have declined. Chicago steel output has risen fractionally. In other districts there has been no material change either for better or worse. The best individual plant operation in the country is that of the Great Lakes Steel Corp., Detroit, which is 50 per cent. The Cleveland mills are averaging 32 per cent.

The failure of steel business to recover the ground lost as a result of the bank crisis may be attributed in large part to the fact that in many sections of the country financial conditions are still unfavorable for business enterprise. This is particularly true in Michigan, where the opening of a new Detroit bank has only partially relieved the situation, and in Ohio, where many small banks are affected by the delay in restoring unrestricted withdrawals from two large Cleveland banks.

However, many industrial plants that were wholly or partially shut down during the past two or three weeks are resuming operations, and a gradual straightening out of the recent entanglements is now more confidently looked for.

THE Ford Motor Co. has made fairly rapid strides in the past week toward resumption of its former production schedule, having reached a total of 1200 to 1400 assemblies a day. Other motor car companies are proceeding more slowly. Chevrolet operated its Detroit plants only three days last week, but will work four days this week. The Ford company is expected to release new steel orders this week, but further Chevrolet buying may not occur for two weeks.

Railroad buying definitely waits upon the consummation of the Administration's plan for railroad reorganization. If, as is predicted, the carriers are to operate under virtual Government dictatorship, the steel industry believes that orders for steel for maintenance and repairs will follow, but no large purchases are believed to be in early prospect. There are renewed intimations that some rail inquiries will appear within the next 30 days.

Lettings of fabricated structural steel for building work, at 13,100 tons during the week, are the largest since the beginning of this month.

Brewery business has not been of large proportions thus far, but the steel trade has received additional orders for plates for tanks and has sold some hoop steel for beer barrels. A prospective development is the introduction of tin cans as a substitute for bottles, the leading can maker having already made some progress experimentally. Large purchases of motor trucks for beer delivery are expected.

ALTHOUGH current steel business is restricted by a variety of adverse circumstances, the nearby outlook is still regarded as fairly promising. The steel trade recognizes that insufficient time has elapsed since the reopening of banks for the restoration of orderly business conditions, and that, moreover, buying in some lines, notably building construction, the railroads and the oil industry, is held back temporarily by the very fact that the Government is undertaking recuperative measures, the exact outcome of which will not be known for some weeks, at least.

PRICE developments of most significance are in raw materials. A further rise of 25c. a ton in the average price of heavy melting steel scrap has occurred at Pittsburgh, and advances of like amount have developed in steel-making grades at Detroit. This is the third consecutive advance of 25c. in three weeks, and brings THE IRON AGE composite price for scrap to \$7.08 a ton against \$7 last week. Other scrap markets are firm, but lack the stimulus of consumer buying to put prices up. At Pittsburgh a definite scarcity in good grades of steel scrap has developed.

Eastern Pennsylvania pig iron makers have announced an advance of \$1 a ton on foundry grades, which are now quoted at \$13.50 a ton, furnace. No sales have been reported at the higher figure. Pig iron buying has continued to expand moderately, and fairly large tonnages are under negotiation. Some buyers desire to cover through the last half of the year, but sellers are declining to quote beyond the second quarter. Steel companies also are limiting contract coverage to the second quarter, although several large users have asked for protection through the third quarter. An advance of \$2 a ton to 2.70c. a lb., Pittsburgh, on galvanized sheets is a possibility, but contracts for second quarter are being accepted at 2.60c.



# ▲▲▲ A Comparison of Prices ▲▲▲

Market Prices at Date, and One Week, One Month and One Year Previous  
Advances Over Past Week in Heavy Type, Declines in Italics

Pig Iron	Mar. 28, 1933	Mar. 21, 1933	Feb. 28, 1933	Mar. 29, 1932
<i>Per Gross Ton:</i>				
No. 2 fdy., Philadelphia....	\$13.34	\$13.34	\$13.34	\$15.59
No. 2, Valley furnace.....	14.50	14.50	14.50	15.00
No. 2 Southern, Cin'ti.....	13.82	13.82	13.82	13.82
No. 2, Birmingham.....	11.00	11.00	11.00	11.00
No. 2 foundry, Chicago*....	15.50	15.50	15.50	16.50
Basic, del'd eastern Pa.....	13.50	13.50	13.50	16.00
Basic, Valley furnace.....	13.50	13.50	13.50	14.50
Valley Bessemer, del'd P'gh.	16.89	16.89	16.89	17.39
Malleable, Chicago*.....	15.50	15.50	15.50	16.50
Malleable, Valley.....	14.50	14.50	14.50	15.50
L. S. charcoal, Chicago.....	23.17	23.17	23.17	23.17
Ferromanganese, seab'd car-				
lots .....	†68.00	68.00	68.00	75.00

\*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

†Contract price; spot quotation \$61.

## Rails, Billets, etc.

<i>Per Gross Ton:</i>				
Rails, heavy, at mill.....	\$40.00	\$40.00	\$40.00	\$43.00
Light rails at mill.....	30.00	30.00	30.00	34.00
Rerolling billets, Pittsburgh..	26.00	26.00	26.00	27.00
Sheet bars, Pittsburgh.....	26.00	26.00	26.00	26.00
Slabs, Pittsburgh.....	26.00	26.00	26.00	27.00
Forging billets, Pittsburgh...	31.00	31.00	31.00	33.00
Wire rods, Pittsburgh.....	35.00	35.00	35.00	37.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb..	1.60	1.60	1.60	1.50

## Finished Steel

<i>Per Lb. to Large Buyers:</i>	Cents	Cents	Cents	Cents
Bars, Pittsburgh.....	1.60	1.60	1.60	1.60
Bars, Chicago.....	1.70	1.70	1.70	1.70
Bars, Cleveland.....	1.65	1.65	1.65	1.65
Bars, New York.....	1.95	1.95	1.95	1.95
Tank plates, Pittsburgh.....	1.60	1.60	1.60	1.60
Tank plates, Chicago.....	1.70	1.70	1.70	1.70
Tank plates, New York.....	1.648	1.648	1.698	1.898
Structural shapes, Pittsburgh.	1.60	1.60	1.60	1.60
Structural shapes, Chicago...	1.70	1.70	1.70	1.70
Structural shapes, New York	1.86775	1.86775	1.86775	1.86775
Cold-finished bars, Pittsburgh	1.70	1.70	1.70	2.00
Hot-rolled strips, Pittsburgh.	1.45	1.45	1.45	1.40
Cold-rolled strips, Pittsburgh.	1.80	1.80	1.80	2.00

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

Finished Steel	Mar. 28, 1933	Mar. 21, 1933	Feb. 28, 1933	Mar. 29, 1932
<i>Per Lb. to Large Buyers:</i>	Cents	Cents	Cents	Cents
Hot-rolled annealed sheets, No. 24, Pittsburgh.....	2.00	2.00	2.00	2.20
Hot-rolled annealed sheets, No. 24, Chicago dist. mill..	2.10	2.10	2.00	2.30
Sheets, galv., No. 24, P'gh...	2.60	2.60	2.50	2.85
Sheets, galv., No. 24, Chicago dist. mill.....	2.70	2.70	2.50	2.95
Hot-rolled sheets, No. 10, P'gh	1.40	1.40	1.45	1.55
Hot-rolled sheets, No. 10, Chicago dist. mill.....	1.50	1.50	1.55	1.65
Wire nails, Pittsburgh.....	1.85	1.85	1.85	1.95
Wire nails, Chicago dist. mill	1.90	1.90	1.90	2.00
Plain wire, Pittsburgh.....	2.10	2.10	2.10	2.20
Plain wire, Chicago dist. mill	2.15	2.15	2.15	2.25
Barbed wire, galv., Pittsburgh	2.35	2.35	2.35	2.60
Barbed wire, galv., Chicago dist. mill.....	2.40	2.40	2.40	2.65
Tin plate, 100 lb. box, P'gh..	\$4.25	\$4.25	\$4.25	\$4.75

## Old Material

<i>Per Gross Ton:</i>				
Heavy melting steel, P'gh....	\$9.25	\$9.00	\$8.50	\$10.25
Heavy melting steel, Phila...	6.75	6.75	6.75	7.25
Heavy melting steel, Ch'go...	5.25	5.25	5.25	7.12½
Carwheels, Chicago.....	8.00	8.00	8.00	7.00
Carwheels, Philadelphia.....	8.00	8.00	8.00	9.50
No. 1 cast, Pittsburgh.....	9.00	9.00	9.00	9.50
No. 1 cast, Philadelphia.....	8.00	8.00	8.00	9.50
No. 1 cast, Ch'go (net ton)...	6.25	6.25	6.25	7.00
No. 1 RR. wrot., Phila.....	7.50	7.50	7.50	8.50
No. 1 RR. wrot., Ch'go (net)	4.50	4.50	4.50	5.50

## Coke, Connellsville

<i>Per Net Ton at Oven:</i>				
Furnace coke, prompt.....	\$1.75	\$1.75	\$1.75	\$2.25
Foundry coke, prompt.....	2.50	2.50	2.50	3.50

## Metals

<i>Per Lb. to Large Buyers:</i>	Cents	Cents	Cents	Cents
Electrolytic copper, refinery..	4.75	5.00	4.75	5.75
Lake copper, New York.....	5.00	5.25	5.00	6.12½
Tin (Straits), New York....	24.25	23.90	23.20	21.20
Zinc, East St. Louis.....	3.00	3.15	2.67½	2.77½
Zinc, New York.....	3.37	3.52	3.04½	3.14½
Lead, St. Louis.....	2.87½	3.12½	2.87½	2.90
Lead, New York.....	3.00	3.25	3.00	3.00
Antimony (Asiatic), N. Y...	5.95	5.95	5.62½	6.12½

# ▲▲▲ The Iron Age Composite Prices ▲▲▲

## Finished Steel

March 28, 1933	1.923c. a Lb.
One week ago	1.923c.
One month ago	1.923c.
One year ago	1.970c.
Based on steel bars, beams, tank plates, wire rails, black pipe, sheets and hot rolled strip. These products make 85 per cent of the United States output.	
	High Low
1933 .....	1.948c., Jan. 3; 1.923c., Jan. 17
1932 .....	1.977c., Oct. 4; 1.926c., Feb. 2
1931 .....	2.037c., Jan. 13; 1.945c., Dec. 29
1930 .....	2.273c., Jan. 7; 2.018c., Dec. 9
1929 .....	2.317c., April 2; 2.273c., Oct. 29
1928 .....	2.286c., Dec. 11; 2.217c., July 17
1927 .....	2.402c., Jan. 4; 2.212c., Nov. 1

## Pig Iron

		\$13.56 a Gross Ton
		13.56
		13.56
		14.43
Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.		
	HIGH	LOW
\$13.56, Jan.	3;	\$13.56, Jan. 3
14.81, Jan.	5;	13.56, Dec. 6
15.90, Jan.	6;	14.79, Dec. 15
18.21, Jan.	7;	15.90, Dec. 16
18.71, May	14;	18.21, Dec. 17
18.59, Nov.	27;	17.04, July 24
19.71, Jan.	4;	17.54, Nov. 1

## Steel Scrap

		\$7.08 a Gross Ton
		7.00
		6.83
		8.21
Based on No. 1 heavy melting steel quotations at Pittsburgh, Philadelphia and Chicago.		
	High	Low
\$7.00, Mar.	21;	\$6.75, Jan. 3
8.50, Jan.	12;	6.42, July 5
11.33, Jan.	6;	8.50, Dec. 29
15.00, Feb.	18;	11.25, Dec. 9
17.58, Jan.	29;	14.08, Dec. 3
16.50, Dec.	31;	13.08, July 2
15.25, Jan.	11;	13.08, Nov. 22



# Pittsburgh Trade Unimproved; Output Still at 13 Per Cent

Railroads, Automotive, Building and Oil Industries Almost  
Entirely Out of the Market—Scrap Higher

PITTSBURGH, March 28.—Releases of finished steel products have failed to increase in the last week, with resultant further decline in finishing mill schedules. The volume of new inquiry is still improving, but in most cases small tonnages are involved, and the aggregate is not impressive.

With the railroads, the automotive industry, the building trades and the oil industry almost entirely out of the market, it is surprising to some that demand has held up as well as it has. Jobbers are taking steel, particularly wire products and galvanized sheets, a little more freely, but still seem to be gaging their requirements to the immediate future. The approach of open weather promises some improvement in demand for reinforcing bars, structural steel and other building products, which has been adversely affected recently by flood conditions in the Ohio and Mississippi valleys.

Steel ingot production in the Pittsburgh district is barely holding its own at 13 per cent of capacity, and in the valleys and nearby northern Ohio plants the rate is about the same. Several large units are entirely inactive, and the leading interest in the two districts is maintaining limited steel-making schedules at only three or four plants. In the Wheeling district, production has risen to 30 per cent, and is supported principally by the requirements of tin mills. This branch of the industry is still engaged at nearly 40 per cent of capacity, although sheet schedules have dropped to 13 per cent, with strip steel, bars and pipe being produced at an even lower rate.

The steel price structure is holding rather satisfactorily in all departments, and reports of an advance in sheet quotations are heard. The asking price on galvanized sheets is almost certain to be marked up early in the new month. Enough second quarter contracting is reported in nearly all finished products to establish current quotations. Nevertheless, buyers are cautious, particularly on certain sheet mill products, where current quotations represent an advance over first quarter buying figures.

The scrap market has registered a further advance, and continues very strong because of limited supplies. Inquiry for pig iron is slightly heavier.

## Pig Iron

The market is slightly more active, particularly from the standpoint of new inquiry. The Westinghouse Air

Brake Co., Wilmerding, Pa., is in the market for a small tonnage, as is the Standard Steel Car Co., Butler, Pa. Most of the radiator and sanitary ware makers in the district are inactive, and iron and steel castings producers are generally not in the market. Prices seem to be somewhat firmer, although the competition of Lake Erie furnaces is still a depressing factor. The Pittsburgh producer is quoting foundry, malleable and Bessemer iron at \$15, while basic is nominal at \$14. Foundry and malleable iron are quotable at \$14.50, Valley furnace, and Bessemer at \$15.

## Semi-Finished Steel

Consumers are showing more interest in their second quarter requirements, although the extension of old contracts is more or less a formality in most instances. The market seems to be holding at \$26, Pittsburgh or Youngstown, on billets, slabs and sheet bars, and \$31 on forging billets. Wire rods are very dull.

## Rails and Track Accessories

This market is still very depressed, with the month's releases the lowest in some time. No rail specifications have come to local mills, and accessories are being taken in insignificant quantities.

## Bolts, Nuts and Rivets

Demand has shown no appreciable change. The absence of sustained buying from the railroads, the building industry and the automotive trade continues to depress the market. Prices on bolts and nuts are unchanged, but additional discounts are being granted on caps and set screws.

## Bars, Plates and Shapes

Inquiry for both reinforcing bars and structural steel has gained in the last week, although new projects are still running well behind the January and February average. Structural lettings are particularly light, as many projects are held up by financial difficulties. The prospective employment relief measures, which may be made known this week, are expected to boost orders for both State and Federal work. Demand for plates has not changed appreciably, although large inquiry is encouraging, and orders for some tankage steel are coming from the oil industry. Railroad purchases for the second quarter have been meager, although most of the carriers have their usual inquiries out. Movement of merchant and alloy steel bars continues very light in the face of low

requirements of the automotive industry. The 1.60c., Pittsburgh, price on bars, plates and shapes has been reaffirmed for second quarter, and is well maintained on all but extremely large tonnages. Reinforcing bars are quoted at 1.40c., Pittsburgh, for mill lengths.

## Cold-Finished Steel Bars

Specifications show no improvement, although resumption of automotive schedules is expected to bring about gains in the near future. The price is well maintained at 1.70c., Pittsburgh.

## Tubular Goods

Demand for oil country products has tapered off sharply in the last week or two, leaving the pipe industry as a whole with little to support production. Standard pipe also seems to be less active, although it had been thought that minimum demand was reached sometime ago. No definite line pipe inquiry has appeared, although producers are expecting the Pure Oil Co. to ask for prices on its proposed line from Toledo to Detroit immediately after the first of the month. Mechanical tubing is very quiet.

## Wire Products

A slight increase in purchases of merchant wire products by jobbers has been in evidence in the past week. Nevertheless, volume is light and has been achieved by diversity of orders rather than by their size. Manufacturers' wire continues very quiet. Prices seem to be fairly well maintained.

## Tin Plate

Specifications show no change and production is barely holding to the 40 per cent rate which has prevailed in the last week or two. Several large makers are not running this well, although some of the leading independents are maintaining a much higher average. Producers report an increase in specifications from makers of bottle caps.

## Sheets

New inquiry is coming out rather steadily, but usually calls for small lots. Forward contracting is proceeding slowly, particularly where an advance in price to the consumer is being attempted. Releases show scarcely any improvement, with the absence of tonnage most marked in the case of full-finishing mills. Recent specifications for this type of material have amounted to scarcely one quarter of the February average. Sheet production has declined further to about 13 per cent of capacity, with the tonnage of jobbing mills holding up best.

Recently established prices on sheet mill products are standing up fairly well under the test of second quarter contracting. Enough business has been booked to establish a fair market,



and mills are already considering a further advance in order to gain back the ground lost earlier in the year. Although mills in this district have not formally announced an advance in galvanized sheets, an asking price of 2.70c., Pittsburgh, which is \$2 a ton over the recent level, is likely in the near future. The 2.60c. figure may remain applicable to jobbers who ordinarily enjoy a preferential price.

### Coke and Coal

Heating coke has been somewhat more active in the past week, but dealers are buying sparingly because of the approach of warmer weather. Foundry coke is very quiet, with prices weak. There is no active demand for the furnace grade.

### Strip Steel

In the absence of much improvement in automotive releases, the strip industry is doing well to maintain its recent low level of production. Mills are averaging 12 to 13 per cent of capacity, which is scarcely half of the prevailing level during February. Hoop makers have experienced better demand from makers of beer kegs and barrels. Hot-rolled strip prices are well maintained at 1.45c., Pittsburgh, while cold-rolled is still quotable at 1.80c. to 2c.

### Scrap

A sale of No. 1 heavy melting steel at \$9.25 to a consumer which paid \$8.75 rather recently has established the scrap market at a higher level. Dealers are paying \$9 to cover both of these orders and are unwilling to make additional sales at the \$9.25 price. Under the circumstances, the market is quotable at \$9 to \$9.50, with hydraulic bundles at a 25c. differential. No. 2 steel is also stronger, and railroad specialties have been sold at \$10.50, an advance of 50c. a ton. Machine shop turnings are strong at recent levels, but quotably unchanged. The scrap melt in the district has not improved, but the almost complete shutting off of shipments from the East and the Detroit district has made steel very scarce in this territory. Any further mill buying would undoubtedly force the market up more, but failure of open-hearth schedules to improve makes this possibility rather remote.

## National Steel to Earn First Quarter Dividend

The National Steel Corp. will more than earn its dividend of 12½c. per share in the first quarter, according to a statement made to stockholders at their annual meeting on March 27 by E. T. Weir, chairman. National Steel was the only major steel company to show a profit in 1932. Stockholders voted to change the capital stock from no par value to \$25 par value.

# British Iron and Steel Industry May Be Completely Reorganized

LONDON, ENGLAND, March 27 (By Cable).—The Tariff Board is now giving consideration to a plan for the reorganization of the British iron and steel industry. The proposals, which have been made by the iron and steel manufacturers themselves, include elimination of redundant and uneconomic plants and the formation of a huge consolidation which will be able to negotiate with foreign groups on behalf of the entire industry. Dorman Long, Ltd., has provisionally agreed on a merger with the South Durham Steel Co.

The British iron and steel situation is gradually improving. Activity is mainly on domestic account, but export inquiry is broadening. Tin plate business is quiet, and some makers are shading prices.

Continental steel markets are still influenced by uncertainties connected with the Raw Steel Cartel and sales syndicates which are to operate under the cartel.

Orders have been booked by Continental mills from the Far East for semi-finished steel and plates. Belgian plate mills are now sold up for three months. The Continental Tube Cartel has booked 75,000 tons of tubes for Russia, and of these Germany will furnish 65,000 tons.

## Cincinnati Pig Iron Sales Only 500 Tons

CINCINNATI, March 28.—Pig iron business the past week totaled about 500 tons. Except for 100 tons of Southern iron purchased by an Indiana consumer, the week's orders were all for single car lots. That \$10, base, Birmingham, is a firm quotation on Southern iron in this district was reflected in the one order placed the past week. Northern iron appears to be steady at \$13, Cleveland. Two substantial inquiries, one for 800 tons and the other for 1200 tons, are still current, but the placing of this business depends upon improvement in the automotive industry.

### Scrap

A few small spot orders constituted the demand for scrap in this district the past week. There is a firmer undertone in prices.

### Steel

With automotive specifications for sheets reduced, current business of district sheet mills is less than 25 per cent of capacity. Despite the tendency of producers to clarify prices, consumers exert some pressure on quotations, but so far without effect. Future

## British Prices, f.o.b. United Kingdom Ports

Per Gross Ton

Ferromanganese, export	£9		
Billets, open-hearth	£5	to	£5 7s. 6d.
Black sheets, Japanese specifications	£11		
Tin plate, per base box	15s. 6d.	to	16s.
Steel bars, open-hearth	£7 17½s.	to	£8 7½s.
Beams, open-hearth	£7 7½s.	to	£7 17½s.
Channels, open-hearth	£7 12½s.	to	£8 2½s.
Angles, open-hearth	£7 7½s.	to	£7 17½s.
Black sheets, No. 24 gage	£8 10s.		
Galvanized sheets, No. 24 gage	£10 10s.	to	£10 15s.

## Continental Prices, f.o.b. Continental Ports

Per Metric Ton, Gold £ at \$4.86

Billets, Thomas	£2 2s.		
Wire rods, No. 5			
B.W.G.	£4 10s.		
Black sheets, No. 31 gage, Japanese	£11 5s.		
Steel bars, merchant	£2 6s.	6d. to	£2 7s. 6d.
Beams, Thomas	£2 4s.		
Angles, Thomas, 4-in. and larger	£2 6s.		
Angles, small	£2 8s.		
Hoops and strip steel over 6-in. base	£3 10s.		
Wire, plain, No. 8	£5 7s. 6d.		
Wire nails	£5 15s.		
Wire, barbed, 4-pt. No. 10 B.W.G.	£8 15s.		

business is slow, current orders being for immediate needs and in small quantities.

## Cast Iron Pipe

Portland, Me., has awarded 3000 ft. of 12-in. to R. D. Wood & Co.

Stoneham, Mass., will readvertise 3400 ft. of 8-in. and smaller quantities of 6-, 10- and 12 in.

Montrose, N. Y., has opened bids on 2100 tons of 6- to 30-in.

Appleton, Wis., closes bids April 1 on 3000 ft. of 8-in., and 5000 ft. of 6-in., class 250, centrifugal pipe or equal; alternate bids on class C sand cast pipe.

United States Pipe & Foundry Co. is low bidder on 213 tons of pipe and fittings for city of Milwaukee at \$14,397.

Ilmo, Mo., opened bids March 28 for a waterworks plant, including 75,000-gal. steel tank on 110-ft. steel tower, deep well turbine and electric motor, 21,125 ft. of 2- to 8-in. cast iron water mains, 27 gate valves and valve boxes, 31 fire hydrants and a pumping station.

Santa Monica, Cal., has awarded 100 tons of 6-in. to Crane Co.

Burbank, Cal., has awarded 136 tons of 8-in. to Itamco Pipe Corp.

Glendale, Cal., has awarded 474 tons of 24-in. to United States Pipe & Foundry Co.

Los Angeles will take bids soon on 2500 tons of 4- to 14-in.

Everett, Wash., has awarded 1275 tons of 12- and 16-in. to Pacific Water Works Supply Co.



# Chicago Steel Business Takes A Slight Upward Turn

Ingot Output Gains Only Fractionally—Improvement in Pig Iron Trade Continues—Scrap Listless

**C**HICAGO, March 28.—Sales and specifications in finished steel are registering slight gains, and shipments show the same trend. Although ingot output cannot be appraised more than a fraction of a point above last week's level, this change marks a turn for the better that has been absent since the bank moratorium.

Specifications for Northern foundry iron are moderately heavier, but the scrap market remains listless except for buying of some cast and malleable grades.

The resumption of automobile manufacturing is an important factor in the iron and steel market, but with it is a slight quickening in demand from miscellaneous consumers. Sellers are once more looking forward to rail orders which they believe may materialize in the next 30 days. Railroad bridge steel takes rather an important place among new structural awards.

## Pig Iron

Improvement in sales noted a week ago is still in evidence and fresh inquiries are very promising. Shipping instructions are heavier, but this gain will not offset losses earlier in the month. It appears quite certain that March shipments will not equal the total in February. Prices are firm at \$15.50 a ton, local furnaces.

## Cold Rolled Strip

New releases against contracts, largely from automobile manufacturers and parts makers, have raised output close to 20 per cent of capacity from a low of 9 per cent, which was reached early in the month. A few second quarter contracts have been placed, but in general new buying is slow. From figures now available it appears that March shipments will not lag far behind the volume moved in February.

## Bolts, Nuts and Rivets

This market is quiet. Second quarter contracts are readily being accepted by consumers. Prices are steady.

## Wire Products

Production of wire products is holding in the range from 20 to 25 per cent. The outlook for the immediate future is still somewhat obscure, though in general sellers anticipate an upturn in demand in April and May. Reports from rural districts are encouraging, though there is nothing as yet to show greater use. A few more second quarter contracts have been

added to books. Consumers appear to be less anxious than they were a week ago to cover beyond second quarter. Manufacturers of crates for beer bottles are in the market for nails.

## Structural Material

Although awards are not large, they represent well diversified classes of work. The Denver & Rio Grande Western is ordering bridge steel, and the North Western has placed a small tonnage. Both Missouri and Kansas have ordered some highway bridges, and the former State is in the market for an additional 2000 tons. Several small World's Fair jobs and an industrial plant further indicate the varied types of projects that are now coming to fabricators. The hospital planned at Duluth, Minn., has been indefinitely postponed, all bids having been thrown out.

## Rails and Track Supplies

Once again there are reports that at least some rail tonnage will be ordered by Western railroads in the next 30 days. In the meantime, this market is very quiet. Both Chicago rail mills are idle. Miscellaneous orders for track supplies remain steady.

## Bars

For the first time since the bank moratorium, the demand for bar mill products is turning upward. Automobile manufacturers, who are resuming operations, account for a part of this tonnage, but an encouraging amount of miscellaneous business also is coming to the mills. Forge shops, bolt and nut makers and shafting producers figure more prominently in this week's business. Farm implement manufacturers, though still on eager schedules, profess to see light ahead, especially in view of low inventories. Miscellaneous demand for rail steel bars is slightly higher.

## Plates

The Denver, Colo., pipe line project has again been revised, so that the steel now needed will be only 1000 tons, compared with the original estimate of 4000 tons. Small tonnages are coming in from breweries. Tank and vat builders for the brewing industry have more of this kind of work on their boards.

## Sheets

Heavier releases by automobile manufacturers, together with an increase in miscellaneous business, have raised sheet output in this district to a range from 20 to 25 per cent of

capacity. The manufacture of steel beer kegs and repairs to old breweries are also contributing to a more active market.

## Cast Iron Pipe

A few small inquiries serve to break the monotony of a market that has been very dull for a long time. Many of these projects are traceable to the Reconstruction Finance Corporation, which recently has extended aid for water works in the South. There is as yet little evidence of a spring demand in the North, but sellers are hopeful for a turn. Private buying is very slow. Prices are steady on the small tonnages that are moving.

## Reinforcing Bars

The prospect of Indiana entering the market for 2000 tons of bars for roadwork and fair assurance that a Chicago industrial building will take 1000 tons are highlights in this market. Also, 750 tons has been ordered for the St. Paul post office. A few small brewery jobs have been placed, but the larger work of this kind is still indefinite. Inquiries are still slow. No gain is noted in shop operations. Prices are holding on such business as is being placed.

## Coke

By-product foundry coke shipments are again turning upward, but the gain is not sufficient to offset losses earlier in the month. Prices are steady at \$7 a ton, local ovens.

## Scrap

Cast wheels and malleable are still in active demand, and prices for these grades are strong. Easily available supplies of these grades are now fairly well taken out of the market, and dealers anticipate that prices will climb higher. The heavy melting steel market is quiet. Occasionally a small tonnage is taken by a mill, but most of these lots are distress in character and they do not strengthen the price structure. A speculative interest in rerolling rails appears to have died out.

## Union Iron Works Now Lidgerwood Subsidiary

Union Iron Works, Hoboken, N. J., which was recently incorporated as the Union Iron Works, Inc., has become a subsidiary of Lidgerwood Mfg. Co., Elizabeth, N. J. The new corporation has removed its activities to the general offices and plant of the Lidgerwood company, where it will develop and enlarge its capacity for producing engineering and contracting equipment. Directors of the Union organization are Lane McLean, chairman; Max Schalscha, president; Walter G. Schalscha, secretary; Gilbert L. Reeh, treasurer, and Stanley J. Perkins.



# Eastern Pennsylvania Pig Iron Advanced \$1 a Ton

Makers Show More Confidence in the Market—Steel Demand Shows Only Minor Improvement

**P**HILADELPHIA, March 28.—While some makers report a moderate increase in inquiries for miscellaneous steel lines, others find there has been no general improvement in demand. The market is spotty, with a slight upturn for some products. The broader inquiry coming to some mills involves small tonnages, but reflects a greater consumer interest, especially for the purpose of replenishing stocks. There has been a moderate upturn in inquiry for sheets and plates, some of it coming from brewing interests and makers of trucks to be built for brewers. One estimate has been made that \$30,000,000 will be expended for brewery trucks and, if the business materializes, it is expected to give an impetus to demand for sheets, axle steel, castings, etc.

Railroad buying is almost nil. Proposals of the Roosevelt Administration looking to rail consolidation and coordination with other forms of transportation are being watched with interest. If a plan of rehabilitation is effected, it is believed that the railroads, with Government support, will come into the market for requirements, though heavy purchases in the near future are not expected.

Ingot output in this district continues at about 10 per cent of capacity.

## Pig Iron

The tone of the market shows continued strength. Recent buying of fair-sized tonnages of foundry and gray forge iron has given domestic makers more confidence in the market. As a result, they are quoting higher levels, naming \$13.50, furnace, for No. 2 plain foundry iron. At the same time they have formally reduced differentials to 25c. on silicon content. Basic iron is quoted at \$13.50, delivered. Foreign iron also has become somewhat firmer. Melters are showing more interest in covering for both the second and third quarters.

## Imports

The following iron and steel imports were received here last week: 4000 tons of chrome ore from Turkey, 2354 tons of pig iron from British India, 50 tons of ferromanganese from Germany, 22 tons of manganese ore from England and 14 tons of structural shapes from Belgium.

## Plates, Shapes and Bars

The market is quiet, but is sentimentally stronger. Plates, however, continue to reflect irregularity, and

quotations of 1.40c. to 1.50c., Coatesville, on carlots are still available, while the level of 1.30c. on 100 tons or more has not entirely disappeared, though it is said to be less common than previously. On less than carlots, plates are quoted at 1.50c. to 1.60c., Coatesville. Shapes are quoted at 1.60c., Eastern mills, and merchant steel bars at 1.60c., Pittsburgh.

## Sheets

A moderate inquiry for sheets for brewery equipment has developed. Prices appear to be holding well at the recently established levels. The Department of Property and Supplies, Commonwealth of Pennsylvania, will open bids on April 13 for 700 tons of full-finished sheets to be made into automobile license tags at the Western State Penitentiary.

## Scrap

The market has a firmer undertone, and some dealers are less inclined to sell at current levels. No. 1 heavy melting scrap continues to be quoted at \$6.50 to \$7. However, any substantial rise in quotations is not looked for until mills generally have absorbed more of their stocks and received larger orders for finished steel than they are getting at present.

## St. Louis Inquiries For Pig Iron Increasing

**S**T. LOUIS, March 28.—Although actual buying of pig iron has picked up very little, inquiries are being received in increasing numbers from virtually all industries, except those catering to agricultural pursuits. Inquiries are divided into three groups: specified tonnages, requirements for a stated period, and speculative. A leading mail order house has placed large stove orders, urging the makers of castings to cover their pig iron requirements for the remainder of this year, which, it is learned, they are having difficulty in doing. Melters believe that substantial orders will develop within the next 30 days. While prices have not advanced the market is firmer, and there is an absence of bargains that melters with cash or sound credit have been able to pick up from time to time.

## Steel

Open-hearth operations continue at about 18 per cent of capacity.

Granite City Steel Co. has opened its books for second quarter with

these prices, delivered St. Louis: galvanized sheets, 2.94c. a lb.; hot-rolled annealed, No. 24 gage, 2.34c.; hot-rolled sheets, 10 gage, 1.74c. This company's orders show improvement, especially in light sheets and tin plate, the heavier products not moving yet. Galvanized sheet demand continues light, as is true of other items required by the agricultural industry. Buying of structural steel has shown no pick-up. Fabricating plants are operating at about 12 per cent of capacity.

Falstaff Corp., brewer, is in the market for 36 tanks, which will require 150 tons of plates. Another local brewery has asked for prices on 100 tons of tank plates for repair work.

## Scrap

The scrap iron market is somewhat firmer, although prices are nominally unchanged. A generally better feeling in the trade here lends strength to the position of dealers. However, mills are not buying. Missouri-Kansas-Texas has issued a list of 4000 tons.

## Birmingham Steel Orders Show Improvement

**B**IRMINGHAM, March 28.—Pig iron buying of last week did not maintain the trend of the preceding week, which developed a moderate volume of second quarter tonnage. Current requirements are still exceedingly restricted, but the outlook continues hopeful. It is expected that pipe and stove melt will increase during the spring season. Inactive customers are beginning to make inquiries or buy small lots in larger numbers than heretofore. The market is said to be firmer than in a long while. Two of the three merchant producers in this district are out of production and steadily reducing their stocks. It will be at least 30 days and perhaps longer before either resumes operations. One may wait until June 1. The quotation for the Southern market is unchanged from \$11. Two furnaces continue in blast, one on basic and one on foundry. Woodward Iron Co., which is operating the foundry stack, will switch within the next week from its No. 3 furnace to No. 2, which is now banked, and No. 3 will be banked.

## Steel

There was a noticeable improvement in bookings last week. Both producers of steel in this district reported moderate increases in new tonnage. It was said to be the best week in some time. The new business was made up mostly of small and varied orders. There was a pick-up in orders from railroads for track maintenance material. Prices are unchanged. Open-hearth operations for several weeks have been the same. During four days of the week there will be five in production and the remainder of the week three.



# Cleveland Steel Output Rises But Business Gain is Slow

## Otis Steel Co. Puts On Open-Hearth, Mainly to Accumulate Ingots—Bank Situation Still Hurts Trade

CLEVELAND, March 28.—While some new releases for steel came from the motor car industry during the week, the orders were for small tonnages and the demand has not reached the volume that was coming from that source in February before the bank holiday.

Steel ingot output in Cleveland was again increased three points this week to 32 per cent of capacity. This gain was caused by the putting on of another open-hearth furnace by the Otis Steel Co. However, this addition was made to accumulate a stock of steel rather than because of an increased demand for finished products.

Industrial conditions in Ohio are still seriously affected by the delay in restoring unrestricted withdrawals by two leading Cleveland banks and by outside banks that are depositors in these banks, and this situation will not be cleared up until the two local banks are reorganized.

Manufacturing consumers are buying steel in very small lots and, with virtually no stocks, many are asking for quicker deliveries than mills can promise. Some scattered small orders for steel are coming from the brewing industry for making beer cases, but no large tonnages of plates are being released for tanks.

In spite of the limited demand, the steel market has a firm tone and talk of higher prices before the end of the second quarter still prevails. The possibility of advances has caused consumers to take more interest in contracts than for some time and there has been considerable contracting for the coming quarter, particularly in bars, plates and shapes. An advance of \$2 a ton has been announced on galvanized sheets for the coming quarter. Other prices are unchanged.

### Pig Iron

The spurt in buying has subsided, and sales by Cleveland interests aggregated only slightly over 3000 tons the past week. Little new inquiry is pending. Furnaces in some cases have taken contracts for delivery through the third quarter at ruling prices. Shipments, which were checked by the bank holiday, have improved, but will be less in March than last month. Prices appear steady at \$13.50 to \$14, Lake furnace, for foundry and malleable iron and \$15, Cleveland, for local delivery.

### Sheets

Some new releases came from the motor car industry during the week, and the purchase of a substantial tonnage of various grades was made by a

leading refrigerator manufacturer. Some tonnage has been brought out by the advance in second quarter prices on cold-rolled sheets, orders for which are being accepted at prices that have prevailed during the first quarter for shipment before April 15. Quite a few contracts have also been closed for the second quarter at the new prices. An advance of \$2 a ton on galvanized sheets to 2.70c., Pittsburgh, has been announced by some of the mills, to become effective April 1.

### Bars, Plates and Shapes

The Columbus, Ohio, post office, requiring 2800 tons of structural shapes, has been placed. The only new inquiry is for small lots. Most of the public work is still being held up by the bank situation. Louisville, Ky., will take bids March 30 for the Southwestern outfall sewer, requiring a considerable tonnage of reinforcing bars. A culvert job in Berea will require 130 tons of reinforcing

bars. Demand for merchant bars shows a moderate gain. Billet steel reinforcing bars lack firmness, with quotations ranging from 1.35c. to 1.40c., Cleveland mill. Demand for plates from boiler shops has gained. Inquiries for plates are still being made by the brewing industry, but little tonnage is as yet coming from that source. Prices are steady at 1.65c., Cleveland, for merchant steel bars and 1.60c., Pittsburgh, for plates and shapes for current orders and the second quarter.

### Strip Steel

New demand from automobile manufacturers is light, and not much tonnage is being released by that industry against outstanding orders. Cold-rolled strip is steady at 1.80c. to 2c., Cleveland, the maximum price applying only to small lots. Hot-rolled strip is firm at 1.45c., Pittsburgh.

### Scrap

The market continues firm, but prices are unchanged aside from the recent advance on blast furnace grades, for which there is some demand for delivery to a Cleveland mill. There is no local demand for steel-making scrap, on which local prices are nominal. Dealers are paying \$8.50 and higher for heavy melting steel to cover against orders recently placed by a Youngstown mill.

## Buffalo Pig Iron Demand Improves Considerably

BUFFALO, March 28.—Better feeling continues in the pig iron market, with a healthy interest in future delivery. More inquiries are coming out for future delivery than have been seen since 1929, with the exception of a slight spurt last August. The volume of tonnage being considered is larger. It is understood that increases in the price of foreign iron are probable owing to the uncertainty of the exchange one or two months hence.

### Scrap

The market continues firm, with no new buying yet. It is probable that the reopening of some heating apparatus plants may bring out some new business in the course of the next week or two. Dealers still believe that no large tonnage is available at present quotations.

### Steel

The American Radiator Co. has reopened its plant for what appears to be a sustained period of operation of four days a week. The Crane Co.'s Tonawanda plant, which has been closed since Jan. 31, will reopen April 3 on full-time schedule. The Lackawanna plant of Bethlehem Steel is operating three open-hearths and Re-

public Steel and Wickwire Spencer are operating one each. A local fabricator has taken a contract for 175 tons of structural steel for a State bridge in Chenango and Otsego counties. There has been some downward revision of warehouse prices.

## Detroit Scrap Prices Up 25c. a Ton

DETROIT, March 28.—Scrap prices have advanced 25c. a ton owing to the tendency of dealers to hold back material in expectation of a higher market and to increased prices at Pittsburgh. The local steel mill is said to be paying more for certain items to prevent their shipment to other consuming centers.

## A New Heating Material

Driver-Harris Co., Harrison, N. J., has announced a new series of Nichrome alloys, to be known as Nichrome V. This is the latest step in the company's development of nickel-chromium alloys. More than 25 years ago the first of the Nichrome series was developed by Driver-Harris Co. The growing demand for increased speed, high temperatures and longer life led to the introduction Nichrome V.



# New York Pig Iron Business Continues to Improve

Steel Orders Very Light, Some Companies Having Had Less Volume Than in the Preceding Week

**N**EW YORK, March 28.—While the volume of incoming steel business in this district has not improved, some companies, in fact, having had a smaller aggregate in the past week than in the week before, there is an undercurrent of optimism that a turn for the better is not far off. This is based largely on the fact that a good many construction projects that were delayed during the banking moratorium are soon to reach the contracting stage and also to the revival of interest among manufacturing consumers in their forward requirements. A few large consumers have asked for price protection through the third quarter, but steel mills are generally not willing to commit themselves beyond the second quarter.

Prospective brewery business has not assumed large proportions in this territory, but there is considerable interest among tin plate makers in a proposal of can companies to manufacture beer cans in pints, quarters and gallon sizes as a substitute for bottles. There has been some demand for hoops for beer barrels.

Prices are steady, but have gained no further strength. Efforts to stiffen plate quotations in the East have met with only slight success. On the ordinary run of business, quotations of 1.40c. to 1.50c., Coatesville, are current, but on large lots 1.40c. has been shaded.

## Pig Iron

A further gain in sales volume occurred last week, when about 4500 tons was sold. Most of this business culminated as a result of quiet negotiating, and, while in some cases it represented much-needed replenishment of stocks, it more frequently reflected a disposition to cover against the possibility of higher prices. A fair amount of consumer interest is still prevalent, but specific inquiry is momentarily scarce. Prices during the recent activity were apparently well maintained, and indications of firming values are now evident. The asking price for eastern Pennsylvania No. 2 plain has been boosted \$1 a ton to \$13.50, but sales at that level have not yet been made. Silicon differentials, which have been waived for some time, are reappearing. Particular strength is noted in Buffalo malleable, which is being held for the full 50c. differential over the base grade. Foreign iron, though quotably unchanged, reflects firmer tendencies.

## Reinforcing Bars

The past week was devoid of important inquiry or awards. Letting of 1000 tons for a viaduct at Newark, N. J., has been temporarily deferred pending settlement of contracting details. Plans for a sports arena at Jersey City, N. J., are taking shape, but bar requirements for this project are not yet established. Price concessions on important quantities are common, but recent base quotations are generally steady for minor lots.

Bids for construction of a bridge over the James River at Richmond, Va., requiring about 3500 tons of reinforcing bars, will be opened April 4 by the Richmond Bridge Corp'n. and publicly read in the City Hall, according to present plans. It is reported,

## Pacific Coast Activity Mainly in Construction

**S**AN FRANCISCO, March 27.—Projects reported for the week involving major tonnages will total 2950 tons of structural steel that has been awarded, while new jobs requiring 1480 tons have been added to the pending list. Awards of 912 tons of reinforcing bars have been made, while new inquiries for 3510 tons have come into the market. At Oakland, Cal., specifications have been completed for the Broadway low level tunnel, which will be twin bores, 34 ft. in diameter and 3168 ft. long. The plans, requiring 2435 tons of reinforcing bars and 672 tons of structural steel, must receive State approval before bids will be called for. Bids are being taken on March 29 at San Francisco on the county jail and pipe line, which will require 1500 tons of structural steel, 650 tons of bars and 410 tons of cast iron pipe.

The Skaget River power house project, on which bids will be opened at Seattle April 26, will use 300 tons of shapes in the towers, for the transmission line, and 250 tons of shapes and 110 tons of sheet piling in the power house itself. Plans are under way at Los Angeles for extensions to the county water systems that will require approximately 2500 tons of cast iron pipe.

Bids are to be taken in April for the \$1,250,000 diversion tunnel near Ordway, Colo., that is to be 3.8 miles long, 9 ft. diameter and partly lined with steel.

Bids are to be taken in May in Los

however, that the date may be postponed. The bridge is one of four projects at Richmond to be built by the Richmond corporation through a Reconstruction Finance Corporation loan of \$1,700,000. The other jobs consist of three viaducts, for two of which it is proposed to open bids April 5. No date for opening of bids for the construction of third viaduct has been set.

## Finished Steel

A sports arena in Jersey City, N. J., on which bids will be taken shortly, calls for 13,000 tons of structural steel.

## Scrap

Activity is still concerned mainly with accumulation of the steel grades for shipment to Japan, Italy and Poland. No new export orders, however, are reported. Brokers continue to pay \$5 for No. 1 and \$3.50 to \$4 for No. 2, on barge. Stove plate for Bayonne, N. J., is being purchased at \$4.50, on barge. Consumer interest in this district is still at a low point. Brokers are not disposed, however, to press sales, evidently preferring to preserve their holdings in expectation of higher prices.

Angeles for a 430-ft. steel bridge at Soto Street over the Pacific Electric Railway tracks. The cost is estimated at \$125,000.

Plans are being prepared at Los Angeles for the construction of grade separations at Gaffey Street at an estimated cost of \$225,000.

## Boston Pig Iron Trade Shows a Little Pick-Up

**B**OSTON, March 28.—Pig iron sales and inquiries are picking up, but are not large. Sales the past week approximated 500 tons, including one lot of 150 tons of Indian iron. The Crompton & Knowles Loom Works, Worcester, Mass., is inquiring for 500 tons of No. 1X, second and third quarter delivery, one furnace representative is negotiating with various melters on 700 tons, mostly No. 2X, and there are some small general inquiries, including a small lot of charcoal iron. Prices are reported as firm. Sellers of Dutch iron are endeavoring to obtain higher prices. Some Indian was sold last week at \$16 a ton on dock here, duty paid.

Interest in scrap again centers in the export market. A steamer is loading 6000 to 7000 tons at Chelsea, Mass., for Japan. The shipment will include 3500 tons of girder rails purchased from the Boston Elevated Railway. The advance in No. 1 heavy melting steel scrap at Pittsburgh leaves prices still short of the level at which that material can be shipped from New England at a profit. A demand still exists for chemical borings, engine blocks, breakable cast and No. 2 cast, but offerings are limited.



# Fabricated Structural Steel

## Awards Gain—New Projects Also in Better Volume

LETTINGS of 13,100 tons are the largest since the first week in March and compare with 4050 tons a week ago. The largest booking, 2830 tons, is for a post office in Columbus, Ohio. New projects call for 19,450 tons, of which 13,000 tons are required for a coliseum in Jersey City, N. J. Inquiries last week were only 2150 tons. Contracts reported in March total 50,300 tons, compared with 47,000 tons in February and 90,465 tons in January. Awards follow:

### NORTH ATLANTIC STATES

New London, Conn., 420 tons, post office, to Ingalls Iron Works.

Willard, N. Y., 300 tons, infirmary building, State Hospital, to Shippers Car Line Corp.

New York, 1350 tons, incinerator plants, to Fassler Iron Works.

Brooklyn, 130 tons, alterations to city brewery, to Belmont Iron Works.

New Berlin, N. Y., 175 tons, bridge over Unadilla River, to Lackawanna Steel Construction Corp.

Bloomfield, N. J., 265 tons, post office, to Passaic Steel & Iron Co.

Newark, N. J., 940 tons, Empire Street viaduct, to McClintic-Marshall Corp.

Milford, N. J., 900 tons, bridge over Delaware River for joint commission (Pennsylvania and New Jersey), for elimination of toll bridge, to McClintic-Marshall Corp.

### THE SOUTH

Amory, Miss., 250 tons, highway bridge, to Pidgeon-Thomas Iron & Steel Co., Memphis.

### CENTRAL STATES

Columbus, Ohio, 2830 tons, post office, to American Bridge Co.

Argo, Ill., 125 tons, Corn Products Co., to Gage Structural Steel Co.

Chicago, 225 tons, Polish exhibition building for Century of Progress, to McClintic-Marshall Corp.

Chicago & North Western, 190 tons, bridge, to American Bridge Co.

Gentry County, Mo., 140 tons, State highway bridge, to Pittsburgh-Des Moines Steel Co.

Platte County, Mo., 470 tons, State highway bridge, to Des Moines Steel Co.

Utica, Mo., 100 tons, State highway bridge, to Kansas City Structural Steel Co.

Wayne County, Mo., 575 tons, bridge, to Stupp Brothers Bridge & Iron Co.

Sumner County, Kan., 200 tons, bridge, to St. Joseph Structural Steel Co.

### WESTERN STATES

Denver & Rio Grande Western, 450 tons, bridges for Dotsero cut-off, to American Bridge Co.

Sunnyvale, Cal., 250 tons, balloon hangar, to Moore Dry Dock Co.

Visalia, Cal., 160 tons, post office, to Golden Gate Iron Works.

San Francisco, 190 tons, Emporium warehouse addition, to Judson-Pacific Co.

San Francisco, 1500 tons, caissons for Golden Gate bridge, to Moore Dry Dock Co.

San Diego County, Cal., 492 tons, State highway bridge, to Consolidated Steel Corp.

Beverly Hills, Cal., 250 tons, post office, to McClintic-Marshall Corp.

Los Angeles, 160 tons, Emma French department store, to Minneapolis-Moline Power Implement Co.

### NEW STRUCTURAL STEEL PROJECTS

#### NORTH ATLANTIC STATES

Jersey City, N. J., 13,000 tons, American Coliseum.

Philadelphia, 1000 tons, building for American Philosophical Society.

State of Pennsylvania, 475 tons, highway bridge between Oakland and Susquehanna boroughs.

Washington, 275 tons, chemistry building for Howard University.

### THE SOUTH

Hattiesburg, Miss., 200 tons, post office.

### CENTRAL STATES

Green Bay, Wis., 100 tons, metropolitan sewage system; bids soon.

Chicago, 150 tons, air show for Curtis Light Institute in Century of Progress.

## Reinforcing Steel

### Awards, 1850 Tons—New Projects, 10,350 Tons

Ocala County, Fla., 285 tons, bridge over East Pass, to Jones & Laughlin Steel Corp.

St. Paul, Minn., 650 tons, post office, to Kalman Steel Co.

San Diego County, Cal., 115 tons, State highway bridge, to Western Metal & Supply Co.

Los Angeles County, Cal., 570 tons, State highway bridge over San Gabriel River, to Concrete Engineering Co.

Granada, Colo., 100 tons, two highway projects, to unnamed bidders.

State of Colorado, 127 tons, highway structures in two counties, to unnamed bidders.

### NEW REINFORCING BAR PROJECTS

Richmond, Va., 3500 tons, bridge over James River; bids to be opened April 4 by Richmond Bridge Corp.

Berea, Ohio, 130 tons, Elm Creek culvert for Cuyahoga County.

Chicago, Ill., 1000 tons, Chicago Carton Co.

State of Indiana, 2000 tons, highway work.

Green Bay, Wis., 210 tons, metropolitan sewage system, bids soon.

Oakland, Cal., 2435 tons, Broadway low level tunnel.

San Francisco, 650 tons, County jail; bids March 29.

Glendale, Cal., 425 tons, Chevy Chase reservoir; bids March 30.

## Pipe Lines

Channel Transport & Marketing Co., 701 Bowder Street, Dallas, Tex., C. W. Murchison, president, plans 8-in. crude oil steel pipe line from oil fields at Conroe, Tex., to point near Houston ship channel, Houston, Tex., about 35 miles.

Los Angeles has awarded contract to Western Pipe & Steel Co., Los Angeles, for quantity of welded steel pipe for water service, at \$32,433.

Public Service Corp. of Tennessee, Inc., Sunbright, Tenn., plans welded steel pipe line from gas fields near Sunbright to points in

State of Missouri, 2000 tons, highway bridges.

### WESTERN STATES

Oakland, Cal., 672 tons, Broadway low level tunnel.

Santa Ana, Cal., 150 tons, department store, bids under advisement.

Seattle, 660 tons, Skagit River power house and transmission lines; bids April 26.

Southern Pacific Railroad, 150 tons, subway at Goshen Junction, Cal.

San Francisco, 500 tons, cranes for San Francisco-Oakland bridge.

Santa Fe Railroad, 100 tons, bridge at Arcadia, Cal.

### FABRICATED PLATE

#### AWARDS

Philadelphia, 450 tons, tank for Publicker Commercial Alcohol Co., to McClintic-Marshall Corp.

Hartland, Wis., 60,000-gal. steel water storage tank and tower, to Pittsburgh-Des Moines Steel Co.

Denver, 2000 tons, Moffat water reservoir project, to Stearns-Roger Mfg. Co.

### NEW PROJECTS

Swampscott, Mass., 100 tons, standpipe.

St. Louis, 150 tons, tanks for Falstaff Corp.

Morgan County, totaling about 12 miles of 10-in. pipe, 14 miles of 8-in., and 20 miles of 6-in. It is proposed to begin work in May.

Clark Pipe Line Co., Oklahoma City, is considering crude oil steel pipe line from oil fields near Oklahoma City to Kendrick, Okla., and vicinity. Cost over \$100,000.

M. G. Williams, Gorman, Tex., is at head of project to build natural gas distributing system at Ozona, Tex., to include about 24,000 lin. ft. welded steel pipe. Cost over \$60,000. Company will be formed to carry out development. H. H. Shaw, Baird, Tex., is interested in project.

## Foundrymen's Association Nominates Officers

The American Foundrymen's Association's Nominating Committee has nominated for officers and directors the following:

For president to serve for one year: Frank J. Lanahan, President, Fort Pitt Malleable Iron Co., Pittsburgh.

For vice-president to serve for one year: Dan M. Avey, Editor, *The Foundry*, Cleveland.

For directors to serve three-year terms each: George Batty, technical director, Steel Castings Development Bureau, Narberth, Pa.; T. S. Hammond, president, Whiting Corp., Harvey, Ill.; R. J. Teetor, general manager, Cadillac Malleable Iron Co., Cadillac, Mich.; R. F. Harrington, metallurgist, Hunt-Spiller Mfg. Corp., Boston; J. L. Wick, Jr., president and general manager, Falcon Bronze Co., Youngstown; for a one-year term, Dr. H. Ries, Cornell University, Ithaca, N. Y., technical director, committee on molding sand research.

The by-laws provide that newly elected officers and directors shall assume office at the annual meeting of the board of directors, which shall be held within 90 days following the close of the annual convention.

## Railroad Equipment

Wheeling Steel Corp. has purchased one motor-driven transfer car from Koppel Industrial Car & Equipment Co.



# Tin Advances While Other Metals Weaken in Absence of Demand

Spot Straits Strong on Acute Position of New York Stocks—  
Copper, Lead Lose Recent Gains; Zinc Off \$3 a Ton

NEW YORK, March 28.—Depressed by lack of support from consuming quarters, the price of electrolytic copper sagged ¼c. a lb. during the week to its present level at 5c., delivered Connecticut. The relatively quick reaction of the price to lower ground, following its climb to 5.75c. immediately after the bank holiday, has had much to do with evaporation of the brisk consumer interest that developed during the rising market. Shipments against standing orders are proceeding at a normal pace, and many contracts are gradually nearing completion. Release of fresh buying, following ultimate fulfillment of these contracts, will largely depend upon the business outlook at the time. Trading in Europe in the past week, while far from approaching significant proportions, was encouraging in comparison with domestic dealings. American sellers have participated in some recent Continental bookings, which lately have averaged about 200 tons

a day. Electrolytic sold on the Continent during the week at 5c. to 5.10c., c.i.f. usual ports. Unrest in Germany has created a virtually stagnant situation in the Berlin market. Interest in the subject of curtailment has been renewed by the prospective visit in April of a Katanga representative. Although his intended visit here is said to be of a routine business nature, it has already created hopes that some of the unfinished business of the international conference last fall will be discussed.

## Tin

A moderate amount of business was transacted in the past week. The spot position of Straits tin at New York has again become acute, with the result that for nearby delivery a premium of about 10 points over April is being asked. Though fairly sizable amounts of tin are expected to arrive here next month, no perceptible increase in New York stocks is expected in view of the fact that a

large part of shipments en route has been sold for April delivery. Owing largely to the tight spot position, the New York price for prompt Straits fluctuated higher during the week. Strength was particularly notable on Friday, when a buying spurt sent the price up to 24.50c. Subsequent weakness in sterling, however, wiped out part of the advance, the price today having settled at around 24.25c. London quotations also ranged higher for the week, with today's postings £150 2s. 6d. a ton for spot standard, £150 17s. 6d. for future standard, and £155 17s. 6d. for spot Straits. The Singapore market likewise tended upward, advancing £2 5s. to £156 5s. Straits shipments up to and including March 25, at 4540 tons, foreshadow a total for March in excess of any period since last April. United Kingdom stocks decreased 281 tons last week to 27,784 tons.

## Lead

Failing to stimulate demand by a reduction of \$2 a ton on March 21, the leading custom smelter reduced its contracting base last week \$5 a ton to 3c. a lb., New York. The largest Midwestern producer likewise lowered its price to 2.87½c., St. Louis. At these lower levels, the price has steadied. With practically all of April requirements covered, buying has been in small volume. Little activity is expected until books are opened late this week for May business.

## Zinc

Metal in second hands, offered at price concessions, forced prime Western quotations to lower levels during the week. Prompt and April zinc is now available at 3c. a lb., East St. Louis, or 3.37c., New York, a drop of \$3 a ton from the quotation a week ago. Demand failed to stir during the price recession, and sellers are content to meet limited needs of regular customers at present quotations. A sharp increase in ore production in the Joplin district last week resulted in a drop of \$1 a ton in ore prices. Ore sales aggregated 4160 tons, compared with 690 tons in the preceding week.

## The Week's Prices. Cents Per Pound for Early Delivery

	March 22	March 23	March 24	March 25	March 27	March 28
Electrolytic copper, N. Y.*	5.00	4.87½	4.75	4.75	4.75	4.75
Lake copper, New York....	5.25	5.12½	5.00	5.00	5.00	5.00
Straits tin, Spot, N. Y.....	24.00	24.20	24.50	....	24.40	24.25
Zinc, East St. Louis.....	3.15	3.10	3.05	3.05	3.00	3.00
Zinc, New York.....	3.52	3.47	3.42	3.42	3.37	3.37
Lead, St. Louis.....	2.97½	2.87½	2.87½	2.87½	2.87½	2.87½
Lead, New York.....	3.10	3.00	3.00	3.00	3.00	3.00

\*Refinery quotations price ¼c. higher delivered in Connecticut.

Aluminum, 98 to 99 per cent pure, 22.90c. a lb., delivered.  
Nickel electrolytic cathode, 35c. a lb., delivered; shot and ingot, 36c. a lb., delivered.  
Antimony, 5.95c. a lb., New York.  
Brass ingots, 85-5-5-5, 5.25c. a lb., New York and Philadelphia.

## From New York Warehouse

Delivered Prices, Base per Lb.

Tin, Straits pig.....	26.00c. to 27.00c.
Tin, bar.....	28.00c. to 30.00c.
Copper, Lake.....	7.00c. to 8.00c.
Copper, electrolytic.....	6.75c. to 7.75c.
Copper, casting.....	6.50c. to 7.50c.
*Copper sheets, hot-rolled.....	13.87½c.
*High brass sheets.....	11.25c.
*Seamless brass tubes.....	13.50c.
*Seamless copper tubes.....	12.62½c.
*Brass rods.....	8.75c.
Zinc, slabs.....	4.37½c. to 4.87½c.
Zinc sheets (No. 9), casks.....	9.25c. to 9.50c.
Lead, American pig....	3.75c. to 4.25c.
Lead, bar.....	5.25c. to 6.25c.
Lead, sheets.....	7.00c.
Antimony, Asiatic.....	8.00c. to 9.00c.
Alum., virgin, 99 per cent plus.....	23.30c.
Alum. No. 1 for remelting, 98 to 99 per cent.....	16.00c.
Solder, ½ and ⅓.....	15.50c. to 16.50c.
Babbitt metal commercial grade.....	21.00c. to 32.00c.

\*These prices are also for delivery from Chicago and Cleveland warehouses.

## From Cleveland Warehouse

Delivered Prices per Lb.

Tin, Straits pig.....	28.25c.
Tin, bar.....	30.25c.

Copper, Lake.....	6.00c.
Copper, electrolytic.....	6.00c.
Copper, casting.....	5.75c.
Zinc, slab.....	4.25c. to 4.50c.
Lead, American pig....	4.00c. to 4.50c.
Lead, bar.....	7.50c.
Antimony, Asiatic.....	8.50c.
Babbitt metal, medium grade.....	16.50c.
Babbitt metal, high grade.....	32.00c.
Solder, ½ and ⅓.....	17.50c.

## Old Metals, Per Lb., New York

Buying prices are paid by dealers for miscellaneous lots from smaller accumulators, and selling prices are those charged to consumers after the metal has been prepared for their uses. (All prices are nominal.)

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible.....	3.75c.	4.25c.
Copper, hvy. and wire.....	3.625c.	4.125c.
Copper, light and bottoms.....	2.75c.	3.50c.
Brass, heavy.....	1.625c.	2.25c.
Brass, light.....	1.375c.	1.75c.
Hvy. machine composition.....	2.625c.	3.00c.
No. 1 yel. brass turnings.....	2.125c.	2.50c.
No. 1 red brass or compos. turnings....	2.375c.	2.75c.
Lead, heavy.....	2.25c.	2.625c.
Zinc.....	6.25c.	1.625c.
Cast aluminum.....	3.75c.	5.00c.
Sheet aluminum.....	8.50c.	10.00c.

## Warning to Pacific Coast Subscribers

A circulation impostor, purporting to represent THE IRON AGE, is calling on Pacific Coast metal-working plants. The Los Angeles Galvanizing Co. reports a call by a man giving the name "J. M. Taylor." Michel & Pfeffer Iron Works, Inc., San Francisco, was visited by "D. E. Brewer."

Neither "Taylor" nor "Brewer" is known to us.

To avoid loss, before paying a salesman make certain that he is an accredited representative, or better still, send payment through the mails.



# Prices of Finished and Semi-Finished Steel, Coke, Coal, Cast Iron Pipe

## BARS, PLATES, SHAPES

### Iron and Steel Bars

#### Soft Steel

Base per Lb.
Fab. Pittsburgh mill .....
Fab. Chicago .....
Del'd Philadelphia .....
Del'd New York .....
Del'd Detroit .....
Fab. Cleveland .....
Fab. Lackawanna .....
Fab. Birmingham .....
C.I.F. Pacific ports .....

#### Billet Steel Reinforcing

(as quoted by distributors)

Fab. P'gh mills, 40, 50, 60-ft. ....
Fab. Birmingham, mill lengths .....
Fab. Cleveland .....

#### Roll Steel

Fab. mills, east of Chicago dist. ....
Fab. Chicago Heights mills .....

#### Iron

Common iron, f.o.b. Chicago .....
Refined iron, f.o.b. P'gh mills .....
Common iron, del'd Philadelphia .....
Common iron, del'd New York .....

#### Tank Plates

Base per Lb.
Fab. Pittsburgh mill .....
Fab. Chicago .....
Fab. Birmingham .....
Fab. Lackawanna .....
Del'd Cleveland .....
Del'd Philadelphia .....
Fab. Coatesville .....
Fab. Sparrows Point .....
Del'd New York .....
C.I.F. Pacific ports .....
Wrought iron plates, f.o.b. P'gh .....

#### Structural Shapes

Base per Lb.
Fab. Pittsburgh mill .....
Fab. Chicago .....
Fab. Birmingham .....
Fab. Lackawanna .....
Del'd Cleveland .....
Del'd Philadelphia .....
Del'd New York .....
C.I.F. Pacific ports (standard) .....
C.I.F. Pacific ports (wide flange) .....

#### Steel Sheet Piling

Base per Lb.
Fab. Pittsburgh .....
Fab. Chicago mill .....
Fab. Buffalo .....

#### Alloy Steel Bars

(Fab. Pittsburgh, Chicago, Buffalo, Hamilton or Canton.)

#### Alloy Quantity Bar Base

2.45c. to 2.45c. per Lb.

#### S.A.E. Numbers

Differential per 100 Lb.

2024 (1/2% Nickel) .....

2124 (1/2% Nickel) .....

2324 (3/4% Nickel) .....

2424 (3/4% Nickel) .....

3124 Nickel Chromium .....

3224 Nickel Chromium .....

3324 Nickel Chromium .....

4124 Chromium Molybdenum (0.16 to 0.35 Molybdenum) .....

4224 Chromium Molybdenum (0.35 to 0.40 Molybdenum) .....

4324 Nickel Molybdenum (0.20 to 0.30 Molybdenum, 1.50 to 2.00 Nickel) .....

5124 Chromium Steel (0.60 to 0.90 Chromium) .....

5224 Chromium Steel (0.80 to 1.10 Chromium) .....

5324 Chromium Spring Steel .....

6124 Chromium Vanadium Spring Steel .....

7224 Silicon Manganese Spring Steel (flat) .....

8224 Rounds and Squares .....

Chromium Nickel Vanadium .....

Carbon Vanadium .....

Above prices are for hot-rolled steel bars, varying quality. The differential for cold-drawn bars is 1/4c. a lb. higher, with standard classification for cold-finished alloy steel bars applying. For billets 4 x 4 to 10 x 10 in., the price for a cross ton is the net price for bars of the same analysis.

Billets under 4 x 4 in. carry the steel bar base. Slabs with a section area of 16 in. or over carry the billet price. Slabs with sectional area of less than 16 in. or less than 3/4 in. thick, regardless of sectional area, take the bar price.

#### Cold Finished Bars\*

Bars, f.o.b. Pittsburgh mill .....
Bars, f.o.b. Chicago .....
Bars, Cleveland .....
Bars, Buffalo .....
Bars, Detroit .....
Bars, eastern Michigan .....
Charting ground, f.o.b. mill .....

\* In quantities of 10,000 to 19,999 lb.

## SHEETS, STRIP, TIN PLATE

### TERNE PLATE

#### Sheets

##### Hot-Rolled

No. 10, f.o.b. Pittsburgh .....
No. 10, f.o.b. Chicago mill .....
No. 10, del'd Philadelphia .....
No. 10, f.o.b. Birmingham .....
No. 10, c.i.f. Pacific Coast ports .....

##### Hot-Rolled Annealed

No. 10, Pittsburgh .....
No. 10, Chicago mills .....
No. 10, Birmingham .....
No. 10, Pacific Coast ports .....
No. 10, wrought iron, Pittsburgh .....

##### Hot-Rolled Annealed

No. 24, f.o.b. Pittsburgh .....
No. 24, f.o.b. Chicago mills .....
No. 24, del'd Philadelphia .....
No. 24, f.o.b. Birmingham .....
No. 24, c.i.f. Pacific Coast ports .....
No. 24, wrought iron, Pittsburgh .....

##### Heavy Cold-Rolled

No. 10 gauge, f.o.b. Pittsburgh .....
No. 10 gauge, f.o.b. Chicago mills .....
No. 10 gauge, del'd Philadelphia .....
No. 10 gauge, del'd Pacific Coast ports .....

##### Light Cold-Rolled

No. 20 gauge, f.o.b. Pittsburgh .....
No. 20 gauge, f.o.b. Chicago mills .....
No. 20 gauge, del'd Philadelphia .....
No. 20 gauge, del'd Pacific Coast ports .....

Note: Automobile body sheet and steel furniture sheets to be quoted henceforth on cold-rolled sheet base prices, with extras for drawing quality.

##### Galvanized Sheets

No. 24 f.o.b. Pittsburgh .....
No. 24 f.o.b. Chicago mills .....
No. 24, del'd Philadelphia .....
No. 24 f.o.b. Birmingham .....
No. 24 c.i.f. Pacific Coast ports .....
No. 24, wrought iron, Pittsburgh .....

##### Long Terns

No. 24, unassorted, 8-lb. coating, f.o.b. Pittsburgh .....

##### Vitreous Enameling Stock

No. 10, f.o.b. Pittsburgh .....
No. 20, f.o.b. Pittsburgh .....

##### Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh .....

No. 28, Chicago mill .....

##### Tin Plate

Standard cokes, f.o.b. P'gh district mill .....

Standard cokes, f.o.b. Gary .....

##### Terne Plate

(F.o.b. Morganoum or Pittsburgh) (Per Package, 20 x 28 in.)

8-lb. coating I.C. ....

15-lb. coating I.C. ....

20-lb. coating I.C. ....

25-lb. coating I.C. ....

30-lb. coating I.C. ....

40-lb. coating I.C. ....

##### Hot-Rolled Hoops, Bands, Strips and Flats under 1/4 in.

All widths up to 24 in., Pittsburgh .....

All widths up to 24 in., Chicago .....

Cooperage stock, P'gh .....

Cooperage stock, Chicago .....

##### Cold-Rolled Strips

F.o.b. Pittsburgh .....

F.o.b. Cleveland .....

Del'd Chicago .....

F.o.b. Worcester .....

Fender stock, No. 20 gauge, Pittsburgh or Cleveland .....

##### WIRE PRODUCTS

(Carload lots, f.o.b. Pittsburgh and Cleveland.)

Extras of 10c. a 100 lb. on mixed and joint carloads. 20c. on pool carloads and 30c. on less than carloads are applied on all merchant wire products. In carloads and mixed carloads a discount of 10 per cent on extras is allowed.

##### To Manufacturing Trade

Bright wire .....

Spring wire .....

##### To Jobbing Trade

Standard wire nails .....

Smooth coated nails .....

Galvanized nails .....

Smooth annealed wire .....

Smooth galvanized wire .....

Polished staples .....

Galvanized staples .....

Barbed wire, galvanized .....

Woven wire fence No. 9 gage, base column, per net ton .....

Chicago and Anderson, Ind., mill prices are \$1 a ton over Pittsburgh base; Duluth, Minn., and Worcester, Mass., mill \$2 a ton over Pittsburgh, and Birmingham mill \$3 a ton over Pittsburgh.

## STEEL AND WROUGHT PIPE AND TUBING

### Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

#### Butt Weld

Inches	Steel	Black Galv.	Wrought Iron	Black Galv.
1/4	51%	28%	1/4	+95 +142%
3/4	51%	28%	3/4	+5 +29%
1	51%	28%	1	28 10%
1 1/4	51%	28%	1 1/4	28 16%
1 3/4	51%	28%	1 3/4	28 20%
2	51%	28%	2	28 23%
2 1/4	51%	28%	2 1/4	28 23%
2 3/4	51%	28%	2 3/4	28 23%
3	51%	28%	3	28 23%

#### Lap Weld

2	51%	28%	2	28 12%
2 1/4	51%	28%	2 1/4	28 12%
2 3/4	51%	28%	2 3/4	28 12%
3	51%	28%	3	28 12%
3 1/4	51%	28%	3 1/4	28 12%
3 3/4	51%	28%	3 3/4	28 12%
4	51%	28%	4	28 12%
4 1/4	51%	28%	4 1/4	28 12%
4 3/4	51%	28%	4 3/4	28 12%
5	51%	28%	5	28 12%

#### Butt Weld, extra strong, plain ends

1/4	51%	28%	1/4	+17 +40%
3/4	51%	28%	3/4	+7 +41%
1	51%	28%	1	28 12%
1 1/4	51%	28%	1 1/4	28 17%
1 3/4	51%	28%	1 3/4	28 23%
2	51%	28%	2	28 23%

#### Lap Weld, extra strong, plain ends

2	51%	28%	2	28 18%
2 1/4	51%	28%	2 1/4	28 18%
2 3/4	51%	28%	2 3/4	28 18%
3	51%	28%	3	28 18%
3 1/4	51%	28%	3 1/4	28 18%
3 3/4	51%	28%	3 3/4	28 18%
4	51%	28%	4	28 18%
4 1/4	51%	28%	4 1/4	28 18%
4 3/4	51%	28%	4 3/4	28 18%
5	51%	28%	5	28 18%

Discounts on steel and wrought iron pipe are net and not subject to any points or preferentials.

Note—Chicago district mills have a base two points less than the above discounts.

Chicago delivered base is 7 1/2 points less.

Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

### Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Steel

2 in. and 2 1/4

2 1/2 in. ....

2 3/4 in. ....

3 in. ....

3 1/4 in. ....

3 3/4 in. ....

4 in. ....

4 1/4 in. ....

4 3/4 in. ....

5 in. ....

5 1/4 in. ....

5 3/4 in. ....

6 in. ....

6 1/4 in. ....

6 3/4 in. ....

7 in. ....

7 1/4 in. ....

7 3/4 in. ....

8 in. ....

8 1/4 in. ....

8 3/4 in. ....

9 in. ....

9 1/4 in. ....

9 3/4 in. ....

10 in. ....

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25 3/4 in. ....

26 in. ....

26 1/4 in. ....

26 3/4 in. ....

27 in. ....

27 1/4 in. ....

27 3/4 in. ....

28 in. ....

## RAILS AND TRACK SUPPLIES

### Rails

Per Gross Ton
Standard, f.o.b. mill .....
Light (from billets), f.o.b. mill .....
Light (from rail steel), f.o.b. mill .....

### Track Equipment

Base per 100 Lb.
Spikes, 9/16 in. and larger .....
Spikes, 1/2-in. and larger .....
Spikes, heel and base .....
Tie plates, steel .....
Angle bars .....
Track bolts, to steam railroads .....
Track bolts, to jobbers, all sizes, per 100 count .....

## BOLTS, NUTS, RIVETS AND SET SCREWS

### Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Per Cent Off List

Machine bolts .....

Carriage bolts .....

Lag bolts .....



Skelp	
(F.o.b. Pittsburgh or Youngstown)	
	Per Lb.
Grooved	1.60c.
Universal	1.60c.
Sheared	1.60c.

Wire Rods	
(Common soft, base)	
	Per Gross Ton
Pittsburgh	\$35.00
Cleveland	\$35.00
Chicago	\$36.00

## COKE, COAL AND FUEL OIL

Coke	
	Per Net Ton
Furance, f.o.b. Connellsville	\$1.75 to \$2.00
Foundry, f.o.b. Connellsville	2.50 to 4.00
Foundry, by-product, Chicago ovens, for delivery outside switching districts	7.00
Foundry, by-product, delivered in Chicago switching district	7.75
Foundry, by-product, New England, delivered	10.00
Foundry, by-product, Newark or Jersey City, del'd	8.20 to 8.81
Foundry, by-product, Phila.	8.50
Foundry, by-product, Cleveland, delivered	7.82
Foundry, Birmingham	5.00
Foundry, by-product, St. Louis, f.o.b. ovens	8.00
Foundry, by-product, St. Louis	9.00

Coal	
	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	\$1.00 to \$1.15
Mine run coking coal, f.o.b. W. Pa. mines	1.10 to 1.25
Gas coal, 1/2-in., f.o.b. Pa. mines	1.25 to 1.40
Mine run gas coal, f.o.b. Pa. mines	1.30 to 1.30
Steam slack, f.o.b. W. Pa. mines	0.25 to 0.35
Gas slack, f.o.b. W. Pa. mines	0.35 to 0.45

Fuel Oil	
	Per Gal. f.o.b. Bayonne, N. J.
No. 3 distillate	4.00c.
No. 4 industrial	3.50c.
	Per Gal. f.o.b. Baltimore
No. 3 distillate	4.00c.
No. 4 industrial	3.50c.
	Per Gal. del'd Chicago
No. 3 industrial fuel oil	3.25c.
No. 5 industrial fuel oil	2.65c. to 2.75c.
	Per Gal. f.o.b. Cleveland
No. 3 distillate	5.25c.
No. 4 industrial	4.75c.

## REFRACTORIES

Fire Clay Brick	
	Per 1000 f.o.b. Works
High-heat Intermediate Duty Brick	\$35.00 to \$30.00
Duty Brick	\$35.00 to \$30.00
Penn.	\$35.00 to \$30.00
Maryland	\$35.00 to \$30.00
New Jer.	\$44.00 to \$7.00
Ohio	35.00 to 25.00 to 30.00
Kentucky	35.00 to 25.00 to 30.00
Missouri	35.00 to 25.00 to 30.00
Illinois	35.00 to 25.00 to 30.00
Ground fire clay, per ton	6.50

Chrome Brick	
	Per Net Ton
Standard size	\$42.50

Silica Brick	
	Per 1000 f.o.b. Works
Pennsylvania	\$38.00
Chicago	47.00
Birmingham	50.00
Silica clay, per ton	8.00

Magnesite Brick	
	Per Net Ton
Standard sizes, burned, f.o.b. Baltimore and Chester, Pa.	\$61.50
Unburned, f.o.b. Baltimore	52.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	38.50
Domestic, f.o.b. Chewelah, Wash.	20.90

## CAST IRON PIPE

	Per Net Ton
6-in. and larger, del'd Chicago	\$41.40
4-in., del'd Chicago	44.40
6-in. and larger, del'd New York	35.30
4-in., del'd New York	38.30
6-in. and larger, Birm'ham	35.00
4-in., Birm'ham	36.00

Class "A" and gas pipe, \$3 extra.

## VALLEY

Per Gross ton, f.o.b. Valley furnace:	
Basic	\$15.50
Bessemer	15.00
Gray Forge	14.50
No. 2 foundry	14.50
No. 3 foundry	14.00
Malleable	14.50
Low phosph., copper free	23.00

Freight rate to Pittsburgh or Cleveland district, \$1.89.

## PITTSBURGH

Per Gross ton, f.o.b. Pittsburgh district furnace:	
Basic	\$14.00
No. 2 foundry	15.00
No. 3 foundry	14.50
Malleable	15.00
Bessemer	16.00

Freight rates to points in Pittsburgh district range from 69c. to \$1.26.

## CHICAGO

Per gross ton at Chicago furnaces:	
N'th'n No. 2 fdy.	\$15.50
N'th'n No. 1 fdy.	16.00
Malleable, not over 2.25 sil.	15.50
High phosphorus	15.50
Lake Super. charcoal, sil. 1.50, by rail	23.17
Southern No. 2 fdy.	16.14
Low phosph., sil. 1 to 2, Copper free	23.07
Silvery, sil. 2 per cent.	23.67
Besa. ferrosil'n, 15 per cent.	28.92

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnaces, not including a switching charge.

## St. LOUIS

Per gross ton at St. Louis:	
No. 2 fdy., sil. 1.75 to 2.25, f.o.b. Granite City, Ill.	\$17.50
Malleable, f.o.b. Granite City	17.50
Northern No. 2 fdy., del'd	17.50
St. Louis	\$17.80 to 18.30
Southern No. 2 fdy., del'd	14.56
Northern malleable, del'd	17.80 to 18.30
Northern basic, del'd	17.80 to 18.30

Freight rates 83c. (average) Granite City to St. Louis; \$2.30 from Chicago; \$4.56 from Birmingham.

## NEW YORK

Per gross ton, delivered New York district:	
• Buffalo, No. 2, del'd east	
N. J.	\$17.41 to \$17.66
East Pa. No. 2 fdy.	14.02
East Pa. No. 2X fdy.	14.82

Freight rates: \$1.53 to \$2.63 from eastern Pennsylvania.

• Prices delivered to New Jersey cities having rate of \$3.41 a ton from Buffalo.

## BUFFALO

Per gross ton, f.o.b. furnace:	
No. 2 fdy.	\$16.00
No. 2X fdy.	16.50
No. 1 fdy.	17.50
Malleable, sil. up to 2.25	16.50
Basic	15.50
Lake Superior charcoal, del'd	23.41

## CINCINNATI

Per gross ton, delivered Cincinnati:	
Ala. fdy., sil. 1.75 to 2.25	\$13.82
Ala. fdy., sil. 2.25 to 2.75	14.32
Tenn. fdy., sil. 1.75 to 2.25	13.82
N'th'n No. 2 foundry	\$17.01 to 17.59
S'th'n Ohio silvery, 8%	21.02

Freight rates, \$2.02 from Ironton and Jackson, Ohio; \$3.51 from Birmingham.

## CLEVELAND

Per gross ton at Cleveland furnace:	
N'th'n No. 2 fdy. (local delivery)	\$15.00
N'th'n fdy. sil. 1.75 to 2.25	16.14
Malleable (local delivery)	15.00
Ohio silvery, 8 per cent.	21.87
Stand. low. phosph., Valley	23.00

Prices are f.o.b. furnace except on Southern foundry and silvery iron. Freight rates: 63c. average local switching charge; \$3.12 from Jackson, Ohio; \$6.14 from Birmingham.

## PHILADELPHIA

Per gross ton at Philadelphia:	
East Pa. No. 2	\$13.34 to \$13.84
East Pa. No. 2X	13.84 to 14.34
East Pa. No. 1X	14.34 to 14.84
Basic (del'd east Pa.)	13.50 to 14.00
Malleable	14.74 to 18.04
Stand. low phosph. (f.o.b. east Pa. furnace)	20.00 to 21.00
Con. b'r's low phosph. (f.o.b. furnace)	20.00 to 21.00
Va. No. 2	21.79
Va. No. 2X	22.29

Prices, except as specified otherwise, are del'd Philadelphia. Freight rates: 84c. to \$1.79 from eastern Pennsylvania furnaces; \$4.67 from Virginia furnaces.

# Pig Iron, Ores, Ferroalloys

## BIRMINGHAM

Per gross ton, f.o.b. Birmingham dist. furnace:	
No. 2 fdy., 1.75 to 2.25 sil.	\$11.00
No. 2 soft, 2.25 to 2.75 sil.	11.50
Basic	11.00

## NEW ENGLAND

Per gross ton delivered to most New England points:	
• Buffalo, sil. 1.75 to 2.25	\$19.05
• Buffalo, sil. 2.25 to 2.75	19.05
† Buffalo, sil. 1.75 to 2.25	18.03
† Buffalo, sil. 2.25 to 2.75	18.03
† Ala., sil. 1.75 to 2.25	15.64
† Ala., sil. 2.25 to 2.75	16.14

Freight rates: \$5.05 all rail from Buffalo, and \$3.66 to \$4.03 rail and water from Buffalo when \$1.25 barge and \$2.13 to New England freight rate are obtainable; \$5.64 rail and water from Alabama to New England seaboard.

\* All-rail rate.

† Rail-and-water rate.

## CANADA

Per gross ton:	
Delivered Toronto	
No. 1 fdy., sil. 2.25 to 2.75	\$22.60
No. 2 fdy., sil. 1.75 to 2.75	22.10
Malleable	22.60
Delivered Montreal	
No. 1 fdy., sil. 2.25 to 2.75	\$24.60
No. 2 fdy., sil. 1.75 to 2.25	23.50
Malleable	24.00
Basic	\$23.00 to 23.50

## Ferromanganese

Per Gross Ton	
Domestic, 80%, seaboard	\$28.00
Foreign, 80%, Atlantic or Gulf port, duty paid	61.00

\* Contract price; spot quotation \$61.  
Prices for lots of one carload or more; extras applied on less than carload lots.

## Spiegeleisen

Per Gross Ton Furnace	
Domestic, 19 to 21%	\$24.00

## Electric Ferrosilicon

Per Gross Ton Delivered	
50% (carloads)	\$74.50
50% (less carloads)	82.00
75% (carloads)	120.00
75% (less carloads)	130.00
14% to 16% (f.o.b. Welland, Ont. (in carloads))	31.00
14% to 18% (less carloads)	36.00

## Bessemer Ferrosilicon

F.o.b. Jackson County, Ohio, Furnace	
Per Gross Ton	Per Gross Ton
10% .....	\$20.50
11% .....	21.00
12% .....	21.50
13% .....	22.50
14% .....	23.50
15% .....	24.00
16% .....	25.00
17% .....	26.50

## Silvery Iron

F.o.b. Jackson County, Ohio, Furnace	
Per Gross Ton	Per Gross Ton
6% .....	\$18.00
7% .....	18.50
8% .....	18.75
9% .....	19.00
10% .....	19.50
11% .....	20.00
12% .....	21.00
13% .....	22.50

## Other Ferroalloys

Ferrotungsten, per lb. wo. del., carloads	94c.
Ferrotungsten, less carloads	\$1.00

## PITTSBURGH

Per gross ton delivered consumers' yards:	
No. 1 heavy melting steel	\$9.00 to \$9.50
No. 2 heavy melting steel	7.50 to 8.00
No. 3 railroad wrought	9.00 to 9.50
Scrap rails	9.00 to 9.50
Rails 3 ft. and under	10.00 to 10.50
Sheet bar crops, ordinary	9.50 to 10.00
Compressed sheet steel	8.75 to 9.25
Hand bundled sheet steel	7.50 to 8.00
Hvy. steel axle turnings	7.00 to 7.50
Machine shop turnings	6.25 to 6.75
Short shov. steel turnings	6.25 to 6.75
Short mixed borings and turnings	5.50 to 6.00
Cast iron borings	5.50 to 6.00
Cast iron car wheels	8.00 to 8.50
Heavy breakable cast	8.00 to 8.50
No. 1 cast	8.50 to 9.50
Railr. knuckles and couplers	10.00 to 10.50
Rail, coil and leaf springs	10.00 to 10.50
Relief steel wheels	10.00 to 10.50
Low phosph. billet crops	10.50 to 11.00
Low phosph. sheet bar crops	10.50 to 11.00
Low phosph. plate scrap	9.50 to 10.00
Low phosph. punchings	10.00 to 10.50
Steel car axles	10.00 to 10.50

## CHICAGO

Delivered Chicago district consumers:	
Per Gross Ton	Per Gross Ton
Heavy melting steel	\$5.00 to \$5.50
Shoveling steel	5.00 to 5.50

Ferrocromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads	9.50c.
Ferrocromium, 2% carbon	10.50c. to 17.00c.
Ferrocromium, 1% carbon	17.50c. to 18.00c.
Ferrocromium, 0.10% carbon	19.50c. to 20.00c.
Ferrocromium, 0.06% carbon	20.00c. to 20.50c.
Ferrovandium, del. per lb. contained Va.	\$2.60 to \$2.80
Ferrocobaltititanium, 15 to 18%, per net ton, f.o.b. furnace in carloads	10.00c.
Ferrophosphorus, electric, or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per gross ton with \$2 unitage	59.00
Ferrophosphorus, electric, 24% f.o.b. Anniston, Ala., per gross ton with \$2.75 unitage	65.00
Ferromolybdenum, per lb. Mo., del. Mo.	46c.
Calcium molybdate, per lb. Mo., del.	80c.
Silico spiegel, per ton, f.o.b. furnace, car lots	\$36.00
Ton lots or less, per ton	41.00
Silico-manganese, gross ton, delivered:	
2.50% carbon grade	85.00
2% carbon grade	86.00
1% carbon grade	100.00
Spot prices	\$5 a ton higher

## Ores

Lake Superior Ore, Delivered Lower Lake Ports

	Per Gross Ton
Old range Bessemer, 51.5% iron	\$42.00
Old range, non-Bessemer, 51.50% iron	48.00
Messabi Bessemer, 51.50% iron	48.00
Messabi non-Bessemer, 51.50% iron	48.00
High phosphorus, 51.50% iron	48.00

Foreign Ore, c.i.f. Philadelphia or Baltimore

	Per Ton
Iron, low phosph., copper free, 55 to 58% iron, dry Spanish or Algerian	\$6.00 to \$8.50
Iron, low phosph., Swedish, average 68% iron	8.00
Iron, basic or foundry, Swedish, average 65% iron	8.00
Iron, basic or foundry, Russian, average 63% iron (nom.)	8.00
Manganese, Caucasian, washed 52%	22.00
Manganese, African, Indian, 50-52%	21.00 to 22.00
Manganese, Brazilian, 48 to 49%	21.00

Per Net Ton

Tungsten, Chinese wolframite, duty paid

Tungsten, domestic scheelite

Chrome, 45%, Cr<sub>2</sub>O<sub>3</sub>, crude, c.i.f. Atlantic seaboard

Chrome, 48%, Cr<sub>2</sub>O<sub>3</sub>, c.i.f. Atlantic seaboard

\*Quotations nominal in absence of min.

## Fluorspar

	Per Net Ton
Domestic, washed gravel 85-5, f.o.b. Kentucky and Illinois mines	\$9.00
No. 2 lump, 85-5, f.o.b. Kentucky and Illinois mines	\$11.00 to 11.50
Foreign, 85% calcium fluoride, not over 5% silicon, c.i.f. Atlantic port, duty paid	\$16.00 to 16.50
Domestic, No. 1 ground bulk, 85 to 92% calcium fluoride, not over 2% silicon, f.o.b. Illinois and Kentucky mines	\$9.00

# Iron and Steel Scrap

## PITTSBURGH

Per gross ton delivered consumers' yards	
No. 1 heavy melting steel	\$9.00 to \$9.50
No. 2 heavy melting steel	7.50 to 8.00
No. 3 railroad wrought	9.00 to 9.50
Scrap rails	9.00 to 9.50
Rails 3 ft. and under	10.00 to 10.50
Sheet bar crops, ordinary	9.50 to 10.00
Compressed sheet steel	8.75 to 9.25
Hand bundled sheet steel	7.50 to 8.00
Hvy. steel axle turnings	7.00 to 7.50
Machine shop turnings	6.25 to 6.75
Short shov. steel turnings	6.25 to 6.75
Short mixed borings and turnings	5.50 to 6.00
Cast iron borings	5.50 to 6.00
Cast iron car wheels	8.00 to 8.50
Heavy breakable cast	8.00 to 8.50
Light cast	8.50 to 9.50
Railr. knuckles and couplers	10.00 to 10.50
Rail, coil and leaf springs	10.00 to 10.50
Roller steel wheels	10.50 to 11.00
Low phos. plate scrap	10.50 to 11.00
Low phos. sheet bar crops	10.50 to 11.00
Low phos. plate scrap	9.50 to 10.00
Low phos. punchings	10.00 to 10.50
Steel car axles	10.00 to 10.50



No. 2 busheling	\$2.00 to \$2.50
Locomotive tires, smooth	1.50 to 1.75
Pipe and flues	1.25 to 1.75
No. 1 machinery cast	6.25 to 6.75
Clean automobile cast	7.25 to 7.75
No. 1 railroad cast	6.00 to 6.50
No. 1 agricultural cast	5.75 to 6.25
Stove plate	5.50 to 6.00
Grate bars	6.25 to 6.75
Brake shoes	6.00 to 6.50

\*Relaying rails, including angle bars to match, are quoted f.o.b. dealers yards.

### PHILADELPHIA

Per gross ton delivered consumers' yards:	
No. 1 heavy melting steel	\$6.50 to \$7.00
No. 2 heavy melting steel	5.00 to 5.50
No. 1 railroad wrought	7.50 to 8.00
Bundled sheets	5.50 to 6.00
Hydraulic compressed, new	5.50 to 6.00
Hydraulic compressed, old	4.00 to 4.50
Machine shop turnings	3.50 to 4.00
Heavy axle turnings	5.50 to 6.00
Cast borings	3.50 to 3.75
Heavy breakable cast	5.50 to 6.00
Stove plate (steel works)	5.50 to 6.00
No. 1 low phosph. heavy	10.00 to 10.50
Couplers and knuckles	8.00 to 8.50
Roller steel wheels	8.00 to 8.50
No. 1 blast furnace	3.50 to 3.75
Spec. iron and steel pipe	5.25 to 5.50
Shafting	12.00 to 13.00
Steel axles	12.00 to 13.00
No. 1 forge fire	5.50 to 6.00
Cast iron car wheels	8.00 to 8.50
No. 1 cast	8.00 to 8.50
Cast borings (chem.)	10.00 to 10.50
Small rails for rolling	9.00 to 9.50

### CLEVELAND

Per gross ton delivered consumers' yards:	
No. 1 heavy melting steel	\$7.00 to \$7.25
No. 2 heavy melting steel	6.25 to 6.50
Compressed sheet steel	6.00 to 6.50
Light bundled sheet	4.00 to 4.50
Drop forge flashings	5.25 to 5.75
Machine shop turnings	3.50 to 3.75
Short shoveling turnings	3.75 to 4.25
No. 1 busheling	5.25 to 5.50
Steel axle turnings	5.00 to 5.50
Low phosph. billet crops	10.00 to 11.00
Cast iron borings	4.50 to 5.00
Mixed borings and short turnings	4.50 to 5.00
No. 2 busheling	4.50 to 4.75
No. 1 cast	7.00 to 7.50
Railroad grate bars	5.00 to 5.50
Stove plate	5.00 to 5.50
Rails under 3 ft.	8.50 to 9.00
Rails for rolling	8.50 to 9.00
Railroad malleable	6.75 to 7.00
Cast iron car wheels	8.00

### BUFFALO

Per gross ton, f.o.b. Buffalo consumers' yards:	
No. 1 heavy melting steel	\$7.00 to \$7.25
No. 2 heavy melting steel	5.50 to 6.00
Scrap rails	6.00 to 6.50
New hydraulic comp. sheets	5.50 to 6.00
Old hydraulic comp. sheets	5.00 to 5.50
Drop forge flashings	5.50 to 6.00
No. 1 busheling	5.50 to 6.00
Hvy. steel axle turnings	4.00 to 4.50
Machine shop turnings	4.00 to 4.50
Knuckles and couplers	9.00
Coil and leaf springs	9.00
Roller steel wheels	9.00
Low phosph. billet crops	9.00 to 9.50
Short shov. steel turnings	5.50 to 6.00
Short shov. mixed borings and turnings	3.75 to 4.25
Cast iron borings	3.75 to 4.25
No. 2 busheling	3.50 to 4.00
Steel axle	10.00 to 11.00
No. 1 machinery cast	9.50 to 10.00
No. 1 cupola cast	8.50 to 9.00
Stove plate	7.00 to 7.50
Steel rails, 3 ft. and under	8.50 to 9.00
Cast iron car wheels	8.00 to 9.00
Industrial malleable	7.00 to 7.50
Railroad malleable	7.00 to 7.50
Chemical borings	7.50 to 8.00

### BIRMINGHAM

Per gross ton delivered consumers' yards:	
Heavy melting steel	\$7.00 to \$7.50
Scrap steel rails	7.00 to 7.50
Short shoveling turnings	4.00
Stove plate	6.00
Steel axles	9.00
Iron axles	9.00
No. 1 railroad wrought	4.50 to 5.00
Rails for rolling	7.50 to 8.00
No. 1 cast	8.50
Tramcar wheels	8.00
Cast iron borings, chem.	8.00

### ST. LOUIS

Per gross ton delivered consumers' yards:	
Selected heavy steel	\$5.50 to \$6.00
No. 1 heavy melting	4.50 to 5.00
No. 1 heavy melting	4.75 to 5.25
No. 1 locomotive tires	5.00 to 5.50
Misc. stand-see rails	5.50 to 6.00
Railroad springs	6.00 to 6.50
Bundled sheets	2.00 to 2.50
No. 2 railroad wrought	5.00 to 5.50
No. 1 busheling	3.50 to 4.00
Cast iron borings and shoveling turnings	2.75 to 3.25
Rails for rolling	6.75 to 7.25
Machine shop turnings	2.00 to 2.50
Heavy turnings	3.00 to 3.50
Steel axle	8.50 to 9.00
Wrot. iron bar and trans.	4.00 to 4.50
No. 1 railroad wrought	3.50 to 4.00
Steel rails less than 3 ft.	7.00 to 7.50
Cast iron car wheels	6.00 to 6.50
Cast iron car wheels	5.50 to 6.00
No. 1 machinery cast	5.50 to 6.00
Railroad malleable	4.00 to 4.50
No. 1 railroad cast	6.25 to 6.75
Stove plate	6.00 to 6.50
Relay, rails, 60 lb. and under	16.00 to 16.50

Relay, rails, 60 lb. and over	\$20.00 to \$21.00
Agricult. malleable	4.00 to 4.50

### BOSTON

Dealers' buying prices per gross ton:	
No. 1 heavy melting steel	\$3.00 to \$3.25
Scrap T rails	2.50 to 2.75
Machine shop turnings	0.80 to 1.00
Cast iron borings	1.05
Bundled skeleton, long	2.00 to 2.10
Forge flashings	3.00 to 3.50
Blast furnace scrap	0.90 to 1.00
Forge scrap	3.00 to 3.25
Shafting	5.00 to 10.00
Steel car axles	9.00 to 9.50
Wrought pipe	4.00 to 4.25
Rails for rolling	4.50 to 5.00
Cast iron borings, chemical	7.00 to 7.25

Per gross ton delivered consumers' yards:

Textile cast	\$7.00 to \$7.50
No. 1 machinery cast	7.50 to 8.00
Stove plate	5.00 to 5.25
Railroad malleable	8.00 to 8.50

### NEW YORK

Dealers' buying prices per gross ton:	
No. 1 heavy melting steel	\$3.50 to \$5.00
No. 2 heavy melting steel	3.50 to 4.50
Heavy melting steel (yard)	1.50
No. 1 heavy breakable cast	5.00 to 5.25
Stove plate (steel works)	2.50 to 2.90
Machine shop turnings	0.75 to 1.25
Shot & shoveling turnings	0.75 to 1.25
Cast borings	0.50 to 1.00
No. 1 blast furnace	0.50 to 1.00
Steel car axles	8.00 to 8.50

Base per lb.

Plates	2.85c
Structural shapes	2.85c
Soft steel bars and small shapes	2.60c
Reinforcing steel bars	2.60c
Cold-finished and screw stock	2.60c
Rounds and hexagons	2.95c
Squares and flats	3.45c
Hoops and bands, under 1/4 in.	3.50c
Hot-rolled annealed sheets (No. 24)	3.10c
25 or more bundles	3.10c
Galv. sheets (No. 24), 25 or more bundles	3.35c
Hot-rolled sheets (No. 10)	2.65c
Galv. corrug. sheets (No. 24), square (less than 3750 lb.)	\$3.61
Spikes, large	2.40c
Small	2.65c
Boat	2.90c
Track bolts, all sizes, per cent off list	70 per cent off list
Machine bolts, 100 count	70 per cent off list
Carriage bolts, 100 count	70 per cent off list
Nuts, all styles, 100 count	70 per cent off list
Large rivets, base per 100 lb.	\$3.00
Wire, black, soft ann't'd, base per 100 lb.	2.65
Wire, galv. soft, base per 100 lb.	3.10
Common wire nails, per keg	2.30
Cement coated nails, per keg	2.30

On plates, structurals, bars, reinforcing bars, bands, hoops and blue annealed sheets, base applied to orders of 400 to 999 lb.

### CHICAGO

Base per lb.	
Plates and structural shapes	3.00c
Soft steel bars	2.75c
Reinforc. bars, billet steel	1.55c to 1.70c
Rail steel reinforcement	1.30c to 1.45c
Cold-fin. steel bars and shafting	3.00c
Rounds and hexagons	3.50c
Flats and squares	3.50c
Bands, 3/16 in. (in Nos. 10 and 12 gages)	2.95c
Hoops (No. 14 gage and lighter)	3.50c
Hot-rolled annealed sheets (No. 24)	3.45c
Hot-rolled sheets (No. 10)	3.20c
Spikes (3/16 in. and lighter)	3.45c
Track bolts	4.30c
Rivets, structural (keg lots)	2.75c
Rivets, boiler (keg lots)	2.75c
Machine bolts	65
Carriage bolts	65
Coach and lag screws	65
Hot-pressed nuts, sq. tap. or blank	65
Hot-pressed nuts, hex. tap. or blank	65
Hex. head cap screws	80 and 10
Cup point set screws	50 and 10
Flat head bright wood screws	50 and 10
Spring cotters	60 and 10
Stove bolts	80
Rd. hd. tank rivets, 7/16 in. and smaller	65
Wrought washers	\$4.50 off list
No. 8 black ann't'd wire, per 100 lb.	\$3.45
Com. wire nails, base per keg	2.30
Cement c't'd nails, base per keg	2.30

### NEW YORK

Base per lb.	
Plates and struc. shapes	3.10c
Soft steel bars, small shapes	3.10c
Iron bars	3.24c
Reinforc. steel bars, sq. twisted and deform.	3.50c
Cold-fin. shafting and screw stock	3.20c
Rounds and hexagons	3.54c
Flats and squares	4.04c
Cold-rolled strip, soft and quarter hard	4.95c
Hoops	3.30c
Bands	3.30c
Hot-rolled sheets (No. 10)	2.75c
Hot-rolled ann't'd sheets (No. 24)	3.25c
Galvanized sheets (No. 24)	3.50c
Long term sheets (No. 24)	4.50c
Standard tool steel	12.00c
Wire, black annealed (No. 10)	3.60c
Wire, galv. annealed (No. 10)	4.05c
Tire steel 1/4 x 1/4 in. and larger	3.40c
Smooth finish, 1 to 2 1/4 x 1/4 in. and larger	3.75c

Spec. iron and steel pipe	\$2.50 to \$2.75
Forge fire	2.75 to 3.00
No. 1 railroad wrought	4.00 to 4.50
No. 1 yard wrought long	3.25 to 3.50
Rails for rolling	5.00 to 5.50
No. 1 cast	4.50
No. 2 cast	4.50
Stove plate (bundy)	4.50
Malleable cast (railroad)	4.00 to 4.50
Cast borings (chemical)	6.00 to 6.50
Per gross ton, delivered local foundries:	
No. 1 machinery cast	\$9.00
No. 1 hvy. cast (cupola size)	7.50 to 8.00
No. 2 cast	4.00 to 4.50

### CINCINNATI

Dealers' buying prices per gross ton:	
Heavy melting steel	\$5.25 to \$5.75
Scrap rails for melting	6.00 to 6.50
Loose sheet clippings	1.00 to 1.50
Bundled sheets	3.75 to 4.25
Cast iron borings	3.00 to 3.50
Machine shop turnings	3.00 to 3.50
No. 1 busheling	4.50 to 5.00
No. 2 busheling	2.75 to 3.25
Rails for rolling	6.50 to 7.00
No. 1 locomotive tires	7.00 to 7.50
Short rails	9.00 to 9.50
Cast iron car wheels	6.50 to 7.00
No. 1 machinery cast	6.50 to 7.00
No. 1 railroad cast	6.00 to 6.50
Burnt cast	4.25 to 4.75
Stove plate	4.25 to 4.75
Agricultural malleable	7.25
Railroad malleable	7.00 to 7.50

Base per lb.

Open hearth spring steel, bases	4.50c. to 7.00c.
Common wire nails, base, per keg	\$2.60
Machine bolt, cut thread:	Off list
1/4 x 6 in. and smaller .65 to .65 and 10	
1/2 x 6 in. and smaller .65 to .65 and 10	
Carriage bolts, cut thread:	
1/4 x 6 in. and smaller .65 to .65 and 10	
1/2 x 6 in. and smaller .65 to .65 and 10	
Boiler tubes, 2-in.	Per 100 Ft.
Lap welded, 2-in.	\$18.05
Seamless welded, 2-in.	19.24
Charcoal iron, 2-in.	24.94
Charcoal iron, 4-in.	63.65

\*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

### ST. LOUIS

Base per lb.	
Plates and struc. shapes	3.25c
Bars, soft steel or iron	3.00c
Cold-fin. rounds, shafting, screw stock	3.30c
Hot-rolled annealed sheets (No. 24)	3.70c
Galv. sheets (No. 24)	4.00c
Hot-rolled sheets (No. 10) up to and inc. 48 in. wide	3.00c
over 48 in. wide	3.15c
Black corrug. sheets (No. 24)	3.75c
Galv. corrug. sheets	4.05c
Structural rivets	4.00c
Boiler rivets	4.00c
Per Cent Off List	
Tank rivets, 7/16 in. and smaller,	
100 lb. or more	65
Less than 100 lb.	60
Machine bolts	65
Carriage bolts	65
Lag screws	65
Hot-pressed nuts, sq. blank or	65
tapped, 200 lb. or more	65
Less than 200 lb.	55
Hot-pressed nuts, hex. blank or	65
tapped, 60 lb. or more	65
Less than 60 lb.	55

### PHILADELPHIA

Base per lb.	
*Plates, 1/4-in. and heavier	2.45c
*Structural shapes	2.45c
*Soft steel bars, small shapes, iron bars (except bands)	2.45c
Reinforc. steel bars, sq. twisted and deform.	2.70c
Cold-finished steel bars	3.35c
*Steel hoops	3.00c
*Steel bands, No. 12 to 3/16 in.	2.75c
incl. steel	5.00c
Spring steel sheets (No. 24)	3.15c
*Hot-rolled annealed sheets (No. 24)	3.15c
*Galvanized sheets (No. 24)	3.50c
*Hot-rolled annealed sheets (No. 10)	2.70c
Diam. pat. floor plates, 1/4 in.	5.00c
Swedish iron bars	5.60c

These prices are subject to quantity differentials except on reinforcing and Swedish iron bars.  
\*Base prices subject to deductions on orders aggregating 4000 lb. or over.  
†For 50 bundles or over.

### CLEVELAND

Base per lb.	
Plates and struc. shapes	2.95c
Soft steel bars	2.75c
Reinforc. steel bars	1.75c to 1.95c
Cold-fin. steel bars	2.95c
Flat rolled steel under 1/4 in.	3.00c
Cold-finished strip	3.00c
Hot-rolled annealed sheets (No. 24)	3.25c
Galvanized sheets (No. 24)	3.50c
Hot-rolled sheets (No. 10)	3.00c
Black ann't'd wire, per 100 lb.	\$2.55
No. 9 galv. wire, per 100 lb.	2.90
Com. wire nails, base per keg	2.10

\*Net base, including boxing and cutting to length.

### CINCINNATI

Base per lb.	
Plates and struc. shapes	3.25c
Bars, soft steel or iron	3.00c
New billet reinforc. bars	3.00c
Rail steel reinforc. bars	3.00c
Hoops	3.50c
Bands	3.25c
Cold-fin. rounds and hex.	3.35c

### DETROIT

Dealers' buying prices per gross ton:	
Hvy. melting steel	\$4.75 to \$5.25
Borings and short turnings	2.75 to 3.25
Long turnings	2.50 to 3.00
No. 1 machinery cast	7.75 to 8.25
Automotive cast	8.00 to 8.50
Hydraulic comp. sheets	4.50 to 5.00
Stove plate	3.00 to 3.50
New No. 1 busheling	3.75 to 4.25
Old No. 2 busheling	1.50 to 2.00
Sheet clippings	1.50 to 2.00
Flashings	2.75 to 3.25

### CANADA

Dealers' buying prices per gross ton:	
	Toronto
Heavy melting steel.....	\$7.00
Rails, scrap.....	7.00
No. 1 wrought.....	6.00
Machine shop turnings.....	2.00
Boiler plate.....	5.00
Heavy axle turnings.....	2.50
Cast borings.....	2.00
Steel borings.....	2.00
Wrought pipe.....	2.00
Steel axles.....	7.00
Axles, wrought iron.....	7.00
No. 1 machinery cast.....	12.50
Sawn plate.....	10.00
Standard carwheels.....	10.00
Malleable.....	10.00



# PLANT EXPANSION AND EQUIPMENT BUYING

## ◀ NORTH ATLANTIC ▶

**F. & M. Schaefer Brewing Co.**, 2 South Ninth Street, Brooklyn, plans plant improvements and modernization, including new bottling works. Cost about \$100,000 with machinery.

**Waldron & Carroll**, 344 West Thirty-eighth Street, New York, manufacturer of metal specialties, has leased plant space in building at 250 West Fortieth Street.

**Atlantic Service Co., Inc.**, 711 Caton Street, Brooklyn, manufacturer of meat choppers, meat saw blades and kindred edge tools, has taken over property at Logan Street and Eastern Avenue, Toronto, for new one-story plant. Cost over \$30,000 with equipment. Works will be operated by Atlantic Service Co., Ltd., St. James Street, Montreal, an affiliated organization.

**Jacob Ruppert Corp.**, 1639 Third Avenue, New York, has plans for new multi-story brewery, including improvements in present plant. Cost over \$3,500,000 with machinery. Company has work under way on new unit for mechanical cooling, storage and distribution, to cost about \$450,000 with equipment. Ely Jacques Kahn, 2 Park Avenue, is architect.

**Sealcone Machinery Co., Inc.**, Brooklyn, has been organized by Neal D. Becker and Harry G. Willnus, 360 Furman Street, to manufacture special machinery and parts.

**Joseph A. Brudermann**, 50 Broad Street, New York, brass and copper goods, has leased floor in building at 41-14 Twenty-fourth Street, Long Island City, for new plant.

**Liberty Brewing Co.**, Woodhaven, L. I., is planning expansion and modernization program, including brew house, bottling and other machinery. Cost over \$350,000 with equipment.

**Brooklyn Metal Stamping Corp.**, 718 Atlantic Avenue, Brooklyn, has leased floor in building at 25 Lafayette Street, for new plant.

**Rex Art Metal & Plating Works, Inc.**, New York, has been organized by Anthony Manente, 674 East Forty-second Street, Brooklyn, and associates, to manufacture metal and metal-plated products.

**Bureau of Supplies and Accounts**, Navy Department, Washington, asks bids until April 4 for motor-generator set (Schedule 9775) for New York Navy Yard.

**Richmond Stamping & Tool Works, Inc.**, Pleasant Plains, Staten Island, N. Y., recently organized by Carl F. Hamman, 43 Goff Avenue, and associates, has taken over property at foot of Maple Shade Lane for manufacture of lawn mowers and other cutting tools. Oscar Olson, 237 Bayview Avenue, Princes Bay, Staten Island, is interested in new company.

**Great Eastern Breweries, Inc.**, 92-94 Main Street, Manville, N. J., has been organized by Louis Knopf and William R. Epps, Jr., capital \$500,000, and will have plans drawn at once for new brewery, including power house, machine shop and other units. Cost over \$350,000 with machinery. C. J. Kupper, 409 East Main Street, Bound Brook, N. J., is engineer.

**Garden Iron Works, Inc.**, Newark, N. J., recently organized, has leased building at 76-78 Garden Street, for establishment of new plant.

**Department of Public Affairs**, City Hall, Newark, Jerome T. Congleton, mayor, director, asks bids until April 6 for equipment for new city railway line, including pumps, ejectors, heaters, power lines, cables, etc. Cost close to \$200,000.

**Kelly Brewing & Malting Co., Inc.**, Paterson, N. J., care of Walter A. Kelly, 531 East Twenty-seventh Street, recently organized, has acquired building at 422-44 Straight Street, and will remodel for new brewing plant. Cost over \$175,000. William F. Wurster, 97 Forest Hill Road, West Orange, N. J., will be vice-president and plant manager.

**George T. Frost & Sons**, 965 East Twenty-third Street, Paterson, N. J., manufacturers of mill supplies and equipment, are considering two-story and basement addition. Cost over \$30,000 with equipment.

**National Tool & Die Co.**, Irvington, N. J., care of William Zeus, 26 Welland Avenue, has been organized by Mr. Zeus and Karl Adron, Irvington, to manufacture tools, dies and kindred mechanical equipment.

**Supply Officer**, Naval Aircraft Factory, Navy Yard, Philadelphia, asks bids until April 3 for bolts, nuts, rivets and screws (Aero Req. 1010), motors, switches, plates and other electrical equipment (S. and A. Req. 5112); until April 6, 200 spring sets metal-cutting band saws (S. and A. Req. 5122).

**Public Works Officer**, Navy Department, Philadelphia, has awarded general contract to J. B. McKenna, 2643 North Hutchinson Street, for extensions and improvements in foundry at \$47,860, exclusive of equipment.

**Ferron Foundry & Mfg. Co.**, Easton, Pa., R. E. Sandt, president and treasurer, has improvement program under way at former local plant of Wilson Foundry Co., and plans early operation for manufacture of farm implements, plow parts, road machinery and other equipment.

**Graupner Brewing Co.**, Tenth and Market Streets, Harrisburg, Pa., Robert H. Graupner, head, plans extensions and improvements, including equipment. Cost close to \$50,000.

**Bureau of Supplies and Accounts**, Navy Department, Washington, asks bids until April 11 for one exhaust gas cooler (Schedule 9781) for Philadelphia Navy Yard.

**D. G. Yuengling & Son**, Pottsville, Pa., plans improvements and modernization in brewery, including bottling and other machinery. Cost over \$50,000.

**Commanding Officer**, Frankford Arsenal, Philadelphia, asks bids until April 3 for equipment for removing fumes caused by dipping annealed products in pickling solution in small arms annealing plant (Circular 332).

**Oneida Community, Ltd.**, Oneida, N. Y., manufacturer of plated metal products, flat silverware, etc., has approved plans for one-story addition to branch plant at Niagara Falls, Ont., 50 x 175 ft. Cost over \$40,000.

## ◀ SOUTH ATLANTIC ▶

**Purchasing and Contracting Officer**, Holabird Quartermaster Depot, Baltimore, asks bids until April 13 for automobile equipment, including piston rings, tanks, vacuum tanks, screws, etc. (Circular 84).

**Taft Airplane Corp.**, Easton, Md., Philip Taft, president, plans new aircraft manufacturing plant for parts production and assembling. Sites are being considered at Easton and Havre de Grace, Md. Cost over \$75,000 with machinery.

**General Purchasing Officer**, Panama Canal, Washington, asks bids until April 6 for one band resaw sharpener, one band resaw filing clamp, 11 steel cylinders, one paint mixer, copper cable and other equipment (Schedule 2852); until April 7, electric motors, 50 and 35-hp. capacity, one protective panel (Schedule 2853).

**Virginia Airship Co.**, Richmond, Va., care of Richard M. Dunn, Westmoreland Place, recently formed to build new type of dirigible, including parts production and assembling, has arranged for increase in capital from \$1,250,000 to \$3,400,000 for expansion.

**Kershaw Oil Mill**, Kershaw, S. C., plans installation of 1000-hp. steam turbo-generator unit, high-pressure boilers, condenser and other power equipment.

**Purchasing Agent**, Post Office Department, Washington, asks bids until April 11 for wire nails, wire ties, rivets, drills, metal stamps and supplies, warehouse and trucks, etc. (Schedule 2).

**Bureau of Supplies and Accounts**, Navy Department, Washington, asks bids until April 4 for one tractor and spare parts (Schedule 9815) for Opa Locka, Fla. Naval Station; turbo-generator sets, circuit breakers and spare parts (Schedule 9702) for Boston Navy Yard; until April 11, one gasoline-powered 10-ton capacity hoist (Schedule 9808) for Sewall's Point, Va., Navy Yard; pumps, spare parts and special tools (Schedule 9788), impulse blades for turbines (Schedule 9787), lubricating graphite (Schedule 9821), 6350 lb. copper nickel alloy tubes (Schedule 9796), 14 electric water cooling drinking fountains (Schedule 9812) for Eastern and Western yards; turbine-driven generating sets, accessories and spare parts (Schedule 9748) for Washington and Puget Sound yards; five air coolers and pumps for alternators (Schedule 9784) for Boston, Brooklyn, Mare Island and Puget Sound yards.

## ◀ NEW ENGLAND ▶

**School Board**, Hamden, Conn., has secured authority to arrange bond issue of \$700,000 for new high school, to include manual training department. R. W. Foote, New Haven, Conn., is architect.

**Sheet Metal Specialties Co., Inc.**, Worcester, Mass., has been organized by Sara Nore, 23 Lenox Street, and associates, to manufacture sheet metal products. Mr. Nore will be president and treasurer.

**New England Pipe & Supply Co.**, 6 Dane Avenue, Boston, pipe, pipe fittings, plumbing equipment, etc., has leased building totaling 27,000 sq. ft. floor space, at Charlestown, Mass., for new storage and distributing plant, with pipe shop and other departments.

**Kerr Welding Co., Inc.**, Worcester, Mass., has been organized by George M. Kerr, 176 Mayfield Street, and associates, to operate a welding and repair works.

**Town Council**, Russell, Mass., plans purchase of electric-operated pumping unit and auxiliary equipment for extensions and improvements in municipal waterworks. W. O. Johnson, Woronoco, Mass., is chairman.

**Arrowhead Tool Corp.**, Wallingford, Conn., has been organized by F. B. Griffin, 410 Whitney Avenue, New Haven, Conn., and R. C. Smith, Meriden, Conn., to manufacture tools and mechanical equipment.

## ◀ CENTRAL DISTRICT ▶

**Board of Public Education**, Administration Building, Pittsburgh, asks bids until April 5 for woodworking machines for repair shop, hardware, fire extinguishers and other equipment. H. W. Cramblet is secretary.

**Crescent Brewing Co.**, Washington, Pa., will carry out improvement and modernization program, including additional machinery. Cost over \$50,000.

**Fort Pitt Brewing Co.**, Sharpsburg, Pa., has awarded general contract to Martin & Nettrout Contracting Co., Diamond Building, Pittsburgh, for two-story addition, 30 x 90 ft. Cost about \$35,000 with equipment. F. F. Bollinger, Fulton Building, is engineer.

**Peter Graff & Co., Ltd.**, Worthington, Pa., operating Buffalo Woolen Mills, has awarded general contract to Shaffer Lumber Co., Kittanning, Pa., for rebuilding plant recently destroyed by fire. Cost about \$100,000 with machinery.

**Pittsburgh Brewing Co.**, 3340 Liberty Avenue, Pittsburgh, has begun plant expansion and modernization, to include additional equipment. Cost over \$100,000 with machinery.

**Industrial Rayon Corp.**, Cleveland, manufacturer of cellulose rayon products, has let general contract to George A. Rutherford & Co., 2725 Prospect Avenue, for second new unit at local mill, two-stories, 40 x 116 ft. Cost over \$40,000 with equipment, making total expansion program of about \$100,000 with equipment. Christian, Schwarzenberg & Gaede Co., Cleveland, is architect.

**Langs Brewing Co.**, Piqua, Ohio, is planning expansion and improvements, including additional equipment. Cost close to \$40,000 with machinery.

**Department of Public Service**, City Hall, Cleveland, William J. Kennedy, director, is acquiring site at West Third Street and Stone Levee, and will soon have plans drawn for new municipal garbage and incinerator plant. Cost about \$700,000 with machinery.

**Christ Riehl Brewing Co.**, Defiance, Ohio, is considering erection of a stock house, storage and distributing unit. Cost about \$75,000 with equipment.

**Contracting Officer**, Material Division, Wright Field, Dayton, Ohio, asks bids until April 3 for two pitch propeller control housings, two controllable pitch propeller flexible shaft connection caps, worms, screws, nuts, washers, etc. (Circular 476); until April 4, 225 lubricator hose and 250 compressor lubricators (Circular 480), tank assemblies, cooling system tubes. (Circular 479); until April 5, aluminum bar, aluminum tubing, aluminum alloy sheet and aluminum alloy tubing (Circular 471), six four-blade club assemblies (Circular 485), 60 landing gear axle assemblies (Circular 469); until April 10, 18 acetylene



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cylinders, each 285 cu. ft. capacity (Circular 491); until April 12, two stainless steel wing panels (Circular 478).

**Sun Oil Co.**, Union Trust Building, Cleveland, has taken out a permit for bulk oil storage and distributing plant, with tanks, etc. Cost about \$50,000 with equipment.

**Master Metals, Inc.**, 6713 Morgan Avenue, Cleveland, recently organized, has taken over metal alloy division of Master Builders' Co., East Seventy-first Street and Euclid Avenue, and will begin operations at once. New company will be affiliated with last noted organization, while controlling interests will be held by National Lead Co., New York. W. C. Beachorman is president; S. W. Flesheim, vice-president and general manager.

**Petersburg Water Co.**, Petersburg, Ind., plans installation of pumping machinery and other equipment, also pipe lines, etc., in connection with extensions and improvements in waterworks. Cost about \$70,000. Charles H. Hurd, Architects' and Builders' Building, Indianapolis, is consulting engineer.

**Stutz Motor Car Co.**, 1002 North Capitol Avenue, Indianapolis, is increasing operations for new light automobile truck, known as Pak-Age car, and will add to working force. Production will be given over largely to assembling, with parts made in outside shops. An expenditure of \$100,000 is planned for car parts. E. S. Gorrell is president.

**Village Council**, Monenci, Mich., has plans for a municipal electric light and power plant and waterworks. Cost over \$125,000 with machinery. Ayers, Lewis, Norris & May, Ann Arbor, Mich., are consulting engineers.

**Wayne Screw Products Co.**, 521 St. Jean Street, Detroit, has been organized by John J. Corin, 2037 Oakman Boulevard, and associates, to manufacture screw machine products and kindred specialties.

**White Star Refining Co.**, 903 West Grand Boulevard, Detroit, manufacturer of lubricating oils, greases, etc., has begun erection of two-story addition to refinery No. 6, Trenton, Mich. Cost over \$45,000 with equipment.

**Anchor Steel & Conveyor Co.**, Detroit, has been organized to manufacture mechanical conveyors, material-handling equipment, etc., and will take over Anchor Steel & Engineering Co., 2563 Bellevue Avenue. Gerrett Waalkes is principal incorporator.

## ◀ MIDDLE WEST ▶

**Florence Stove Co.**, Kankakee, Ill., with headquarters at Gardner, Mass., manufacturer of oil, gas and electric stoves, parts, etc., has plans for one-story addition, 220 x 360 ft. Cost about \$85,000 with equipment. Austin Co., 510 North Dearborn Street, Chicago, is architect and engineer.

**United Iron & Wire Co., Inc.**, Chicago, has been organized, capital \$50,000, to manufacture iron and steel products, wire specialties, etc. Company will take over United Iron & Wire Works, 3715 South St. Louis Avenue. Samuel and Meyer Brownstein are principal organizers of new company.

**Pyle-National Co.**, 1334 North Kostner Street, Chicago, manufacturer of railway electric equipment, small turbo-generators, head-lights, etc., has leased space in plant of Jenkins Brothers, Ltd., St. Remi Street, Montreal, for new branch works for Canadian trade.

**Jacob E. Decker & Sons Packing Co.**, Mason City, Iowa, meat packer, is considering addition to plant. Cost about \$65,000 with equipment.

**Perfection Oil Co.**, Dubuque, Iowa, has plans for new bulk oil storage and distributing plant. Cost about \$50,000 with tanks, pumping plant and other structures.

**Black & Veatch**, Mutual Building, Kansas City, Mo., consulting engineers, have plans and surveys under way for a new hydroelectric power project and irrigation system near Ord, Neb., for company now being formed under direction of C. A. Sorensen, Lincoln, Neb., attorney. Generating plant will be located on North Loup River. Project will cost over \$600,000.

**City Council**, Aberdeen, S. D., contemplates early call for bids for equipment for municipal electric light and power plant, including traveling crane. Project will include electric distributing system. Cost about \$975,000 with machinery. Special election has been called April 18 to approve bonds in amount noted.

**United States Engineer Office**, First District, Chicago, asks bids until April 4 for one full-revolving, gasoline engine-driven, combination clam-shell crane and dragline excavator (Circular 187).

**Keeley Brewing Co.**, 516 East Twenty-eighth Street, Chicago, is planning improvements and

modernization program, including additional equipment. Cost about \$125,000 with machinery.

**City Council**, Fairfield, Iowa, is planning erection of a municipal electric light and power plant. Cost about \$375,000 and fund of that amount is now being arranged.

**Metalcraft Corp.**, 361 West Superior Street, Chicago, has been organized by A. A. Schulman and Herman Spertus to manufacture metal goods, including lamps, etc.

**Col. Charles M. Pearsall**, Milwaukee, in charge of Government work for war veterans in Wisconsin, has been authorized to receive estimates for erection of a new power plant costing between \$135,000 and \$150,000 for veterans' home and hospital at Milwaukee to replace plant originally established 60 years ago. Bids will be asked about May 1.

**Milwaukee Road** has recalled 850 employees of the passenger car repair department of its West Milwaukee shops, closed since Feb. 15, to restore old cars in preparation for Chicago Century of Progress Exposition traffic.

**Milwaukee Department of Public Works**, City Hall, Milwaukee, will be ready for bids about May 1 for new Menomonee Valley booster pumping station, 42 x 62 ft., 30 ft. high. Equipment specifications will be issued shortly. Herbert H. Brown is engineer in charge.

## ◀ SOUTH CENTRAL ▶

**Bavarian Brewing Co.**, Twelfth and Pike Streets, Covington, Ky., will take bids soon for two-story addition and improvements in plant, including new equipment. Cost over \$150,000. Leslie S. Deglow, 9 West Fourth Street, Cincinnati, is architect; Carl J. Kiefer, Schmidt Building, Cincinnati, is consulting engineer.

**American Refrigerating Machinery Co.**, Louisville, has been organized by Joseph G. Sachs, Jr., Inter-Southern Building, and associates, to manufacture refrigerating machinery and parts.

**Frank Fehr Brewing Co.**, Louisville, is arranging for sale of about 500,000 shares of stock, portion of fund to be used for plant expansion and improvements, including equipment.

**Standard Brewing Co.**, New Orleans, is planning an expansion and modernization program, including equipment. Cost over \$75,000 with machinery.

**L. W. Brooks**, P. O. Box 1422, Knoxville, Tenn., is planning purchase of hydraulic presses, from 75 to 200 tons, for production of plastic products.

## ◀ SOUTHWEST ▶

**City Council**, Trenton, Mo., has plans for a municipal electric light and power plant, also distributing system. Fund of \$350,000 is being arranged. Burns & McDonnell Engineering Co., Interstate Building, Kansas City, Mo., is consulting engineer.

**Wirt-Franklin Petroleum Co.**, Ardmore, Okla., is considering addition to gasoline refinery at Lowery, Okla., including additional equipment. Cost over \$30,000.

**Eagle-Picher Mining & Smelting Co.**, Miami, Okla., has resumed operations at lead and zinc properties, including mines and mills, reinstating about 500 men.

**State Board of Affairs**, State Capitol Building, Oklahoma City, Okla., W. C. Hughes, chairman, has plans for new one and two-story power plant, 60 x 175 ft., at Oklahoma State Penitentiary, Stringtown. Installation will include three electric generators, boilers, pumping machinery and auxiliary equipment; also ice-manufacturing department and machine shop. Cost over \$100,000. Layton, Hicks & Forsyth, Braniff Building, Oklahoma City, are architects.

**Board of Public Works**, Springfield, Mo., plans installation of pumping machinery and other equipment, also pipe lines, for extensions and improvements in municipal sewage disposal works and system. Fund of \$275,000 is being arranged. J. F. Hendrickson is city engineer.

**American Airways, Inc.**, Southern Division, Love Field, Dallas, Tex., has engaged A. Epstein, 2001 West Pershing Road, Chicago, architect and engineer, to draw plans for hangar, 135 x 200 ft., with two-story lean-to, 25 x 140 ft., for repair and reconditioning shop. Bids will be asked on general contract in April. Cost about \$100,000 with equipment.

**J. B. Ehrsam & Sons Mfg. Co.**, Enterprise, Kan., manufacturer of grinding machinery and kindred equipment, is considering one-story foundry addition; also one-story shop

for steel plate work. Cost over \$35,000 with equipment.

**Freeman-Hampden Oil Corp.**, Wichita Falls, Tex., plans new oil refinery at Lueders, Tex., about four miles from producing wells. Cost over \$250,000 with equipment.

## ◀ PACIFIC COAST ▶

**Humboldt Brewing Co.**, Eureka, Cal., care of G. H. Mullin, 1988 Vallejo Street, San Francisco, is planning expansion and improvements at brewery at Eureka, including mechanical bottling and other machinery. Cost about \$200,000 with equipment.

**Bureau of Power and Light**, 207 South Broadway, Los Angeles, plans early call for bids for new power substation on Kincadine Avenue, Palms district. Cost about \$75,000 with equipment. F. L. Roehrig, 35 South Raymond Avenue, Pasadena, Cal., is architect.

**Bureau of Supplies and Accounts**, Navy Department, Washington, asks bids until April 4 for one motor-driven milling machine (Schedule 9793), until April 11, 26,250 lb. welding electrodes (Schedule 9811) for Mare Island Navy Yard; three motor-driven radial drilling machines (Schedule 9817) for Puget Sound yard.

**Grant Union High School District**, Sacramento, plans vocational training shops at new two-story high school in North Sacramento; bids being asked on general contract. Cost about \$100,000. Harry Devine, California State Life Building, is architect.

**Rainier Brewing Co.**, 364 South Central Avenue, Los Angeles, is considering new multi-story brewing plant, with power house, mechanical cooling plant and other units. Cost over \$500,000 with machinery.

**Associated Oil Co.**, 79 New Montgomery Street, San Francisco, has awarded general contract to Dinwiddie Construction Co., Crocker Building, for extensions and improvements in oil-treating plant at refinery at Avon, Cal. Cost over \$45,000.

**Century Roofing Products Corp.**, Peyton Building, Spokane, Wash., is arranging for purchase of plant of Inland Empire Refining Co., Parkwater, near Spokane, and will remodel for manufacture of roofing products. Three one-story units will be built. Entire project will cost over \$65,000. J. E. Franklin, Spokane, is architect. Roy E. Stanley is general manager.

**Great Northern Railroad Co.**, St. Paul, Minn., has reopened car and locomotive repair shops at Spokane, Wash., following shutdown for several weeks, and will operate on five and one-half day week basis, recalling about 250 men.

## ◀ FOREIGN ▶

**Michelin Tire & Rubber Co., Ltd.**, Paris, France, has authorized new plant at Zabehlice, near Prague, Czechoslovakia, for manufacture of automobile tires and tubes. Cost over \$250,000 with equipment. Subsidiary has been organized with capital of 10,000,000 crowns (about \$300,000) to carry out project.

**Government Steel Works**, Yamato, Japan, operated under direction of Ministry of Interior, Tokyo, is planning new works on neighboring site for manufacture of industrial chemicals, dyestuffs, etc. Cost over \$450,000 with equipment. New unit will be operated in conjunction with steel plant. Japanese Cabinet has approved bill for formation of Japan Iron Mfg. Co., to operate iron and metal works.

**Bavarian Nitrogen Works Co.**, Trostberg, Bavaria, is arranging for purchase of Central German Nitrogen Works Co., Piesteritz-on-Elbe, Germany, and will consolidate. Acquired interest is capitalized at 20,000,000 m. (about \$4,760,000). Expansion program is planned for production of nitrogen, cyanamide and kindred products.

**Triplex Machine Tool Corp.**, New York, has removed its office from 50 Church Street to the World-Telegram Building, 125 Barclay Street.

**Chain Belt Co.**, Milwaukee, has appointed R. L. Harrison Co., Inc., Albuquerque, N. M., as distributor of Rex construction equipment.

**Westinghouse Electric & Mfg. Co.**, East Pittsburgh, has concentrated its aviation activities in the transportation sales department, under the general direction of M. B. Lambert, sales manager. A. P. Schrader will direct and supervise the aviation organization. The Westinghouse company now serves almost every phase of aviation.



# GALVANIZED SHEETS



ONLY A FEW YEARS AGO You took the galvanized sheets of that day and tried to fit them to your requirements. And all too often they were unsatisfactory.

Now Armco offers you a correct galvanized sheet for each special purpose. Galvanized Ingot Iron for construction that must endure corrosive attack . . . galvanized steel and copper-bearing steel sheets where an inexpensive full-coated metal will serve . . . Armco "Paintgrip," if the

full-weight galvanized metal is to be painted immediately after installation . . . special tight-coated sheets for severe forming operations . . . and others for unusual applications.

All these different kinds of galvanized sheets are expertly made on improved modern equipment. Every sheet is minutely inspected before shipment to you. And, even more important, the metal bears the Armco name, a fine tradition in iron and steel manufacture.

Savings and satisfaction go with your purchase of Armco Galvanized sheets. Just describe your present needs to our nearest office.

**ARMCO**  
*Special-Purpose*  
**SHEETS ▽ PLATE ▽ PIPE**

**THE AMERICAN ROLLING MILL CO.**

*Executive Offices: MIDDLETOWN, OHIO*

**DISTRICT OFFICES:** Boston . Chicago . Cleveland  
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## Production Control System Employs Addressograph Equipment

(Concluded from Page 505)

keep material lists in books in the stock room. As changes occur it is hard to tie up definite orders for machines with these changes. It is also frequently necessary for stock keepers to copy off long lists of figures with the quantities from the pages of this book so that they may fill the orders for parts. Using the Dupligrath in this manner, makes it so easy to issue the necessary copy, both to the shop and also extra copies to the cost department for compiling their cost information. Issuing orders of this type can be handled very rapidly in the office, one operator easily issuing 20 complete orders per hour or 160 orders per day in an 8-hr. day.

Time is saved not only in issuing these orders but also in the fact that the cost of any additional copies required to perform various functions throughout the shop is so little that their cost can be neglected.

This brief description shows how readily Addressograph - Multigraph equipment may be adapted to practically any factory where information in regard to parts, assemblies, etc., is repeated from one order to the next, with large savings in speed, accuracy and money and with absolute permanence and safety of the records involved.

## Needless Transportation in Industry

(Concluded from Page 506)

ash in its coal shipped to by-product coke ovens. When I saw the greatly reduced tonnages of coal mined and transported, there were times when I almost regretted my part in the campaign for clean coal, which was so vigorously waged by blast furnace and coke oven men, especially since 1923. It was a double-edged sword cutting into the volume of coal required; the better the coal, the less sold, and the better the coal-burning practice, the less coal needed. The acceptance by coal operators of the necessity for clean coal has already placed the coal industry in good position. With recovery of demand for coking, steam and gas coals the coal operators will be further advanced in the reducing of needless volume within the steel industry than will be the iron ore men.

The anthracite coal industry, which made a dangerous alliance with 18 per cent permissible extraneous ash during the war under Government supervision, has already started on its volume reducing campaign; but anthracite is no longer a factor in the steel industry. It is, however, a striking

example of a product that is seeking, and is finding, its "supremacy areas."

The movement of clean coking coal that started from Nemaquin to Youngstown this month means a reduction in volume within the steel industry, though less ton-miles for the railroads, but it is a necessary step in maintaining the steel industry in the Mahoning Valley.

Now is a most opportune time to face the facts, and to inaugurate the practice of eliminating useless volumes within the steel industry.

## Manufacture and Heat Treatment of Twist Drills

(Concluded from Page 509)

each. The work is then quenched in oil which leaves it in the austenite form and this is changed by reheating (drawing) to 1060 deg. F. for the small and 1100 deg. F. for the large drills and allowing them to soak at this heat from 1½ to 2½ hr.

### Modern Heat-Treating Equipment Used

The heat treating division of this plant is equipped with modern design furnaces, lead pots, and other equipment incident to this phase of the work, and this includes automatic temperature control and recording apparatus. A furnace of new and novel design is provided for high temperature work in the final heat treatment. Of the semi-muffle type this furnace is of a box-like construction, built of firebrick and suitably insulated. Instead of being charged through a door in the side, the work is put in through an opening in the top which is a mere slit. Inside the furnace sets a Carborundum muffle and the work remains in this while being heated.

Heat is supplied through two vertical rows of gas burners located in the outer wall, at opposite corners, and as the corners of the furnace are rounded these fire tangentially against the inside of the wall and between it and the muffle. There are four burners in each row, eight in all, and this method of firing insures complete circulation of the hot products of combustion and even distribution of heat. There is an air pipe on the top, front edge of this furnace and the air, through a number of perforations, blows the rising heat back under a hood where it is removed by an induced draft. This makes for ideal operating conditions.

The temperature of the muffle and furnace is maintained with an auto-

matic temperature control consisting of a thermocouple, potentiometer and motor-operated valve in the air line. The gas burners are of the automatic-proportioning type with air supplied at 1-lb. pressure which inspirates the gas in any desired ratio. The pressure of the air is raised by a motor-driven blower and supplied to the burners through a single line, and the motor-operated valve is cut into this line. When the heat rises above the degree set on the indicator the motor is energized and closes the valve, thus shutting off the fuel supply to the burner; conversely, when the temperature drops, the flow of fuel is restored. A recording pyrometer is part of this equipment.

The preheat furnace that goes with the high-heat furnace just described is a lead bath held in a pot surrounded with a furnace. There is another hardening unit in which the high-heat furnace and the preheat furnace are similar to the ones already mentioned. Hardening is also accomplished in a box-type furnace of brick and steel which is 3 ft. in each dimension and to which heat is furnished through two gas burners on each side, or six in all. This is provided with the same type of temperature control except that an indicating pyrometer replaces the recording type.

### Gas-Fired Furnaces of Different Types Employed

There are two other hardening units of a different type, consisting of the box-type furnace of brick and steel, but containing cylindrical heating and combustion chambers. One of these is about 4 ft. long, 3 ft. wide, 3 ft. high and sets on 4-ft. legs. It is equipped with four gas burners on each side, eight in all, which fire tangentially to the inner wall of the combustion chamber as outlined in the semi-muffle furnace. This unit, for large work, is provided with an indicating pyrometer and a hot oil bath for quenching. The other unit, slightly smaller, is used for smaller work. It has no preheat.

### Automatic Temperature Control

There are several box annealing and drawing furnaces of the conventional type equipped with counterweighted doors and steel aprons in front to aid in loading and unloading. These are underfired with gas burners, and the combustion system is like the one on the semi-muffle. Practically all of the furnaces in this plant, including the several forge furnaces, are equipped with automatic temperature controls similar to the one described. The system of firing employed is very flexible and with it any furnace atmosphere, reducing, neutral or oxidizing can be provided, and once set is maintained automatically regardless of fluctuations in the volume of fuel flow or work being heated. Exactness of temperature control is the vital factor in this work and is accomplished with great fidelity in this plant.



# TONCAN IRON PIPE

## IS EASY TO FABRICATE



Every fabricator who has ever used Toncan Iron Pipe knows how easy it is to work. Because of its ductility, it works very readily, either cold or hot. Because it contains almost no carbon, heat treating does not result in hardening. It can be normalized to relieve strains and to improve grain structure after working. And it is easily threaded or welded.

For these reasons you can safely specify Toncan Iron Pipe for any installation requiring flaring, bending, belling, welding, threading or vanstoning. Your fabricator will bear out this statement and, furthermore, if any doubts exist in your mind, will be glad to take you right out

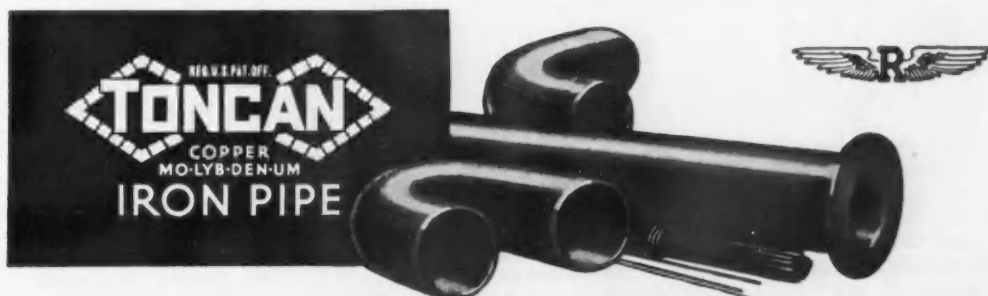
into his plant where you can see these operations performed by ordinary shop-practice methods.

Toncan Iron Pipe is now universally recognized as the modern alloy of refined iron, copper and molybdenum, with rust-resisting qualities placing it first among the ferrous metals after stainless steel. This rust-resistance can be made uniform throughout any piping installation by the use of Toncan Iron couplings and threaded fittings, welding fittings and welding rod—all of the same analysis as the pipe itself.

Write for additional information on these vital subjects of fabrication and resistance to rust.

## REPUBLIC STEEL CORPORATION

GENERAL OFFICES . . . YOUNGSTOWN, OHIO





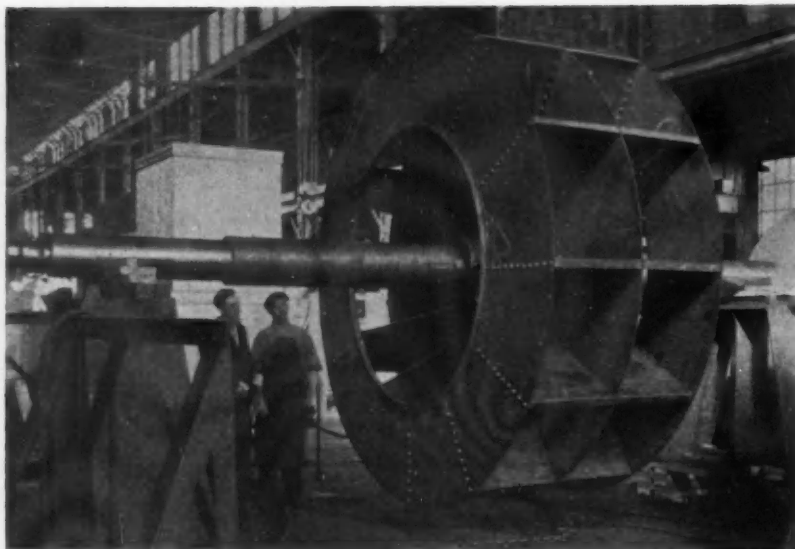


Fig. 3—Heavy-duty steel plate fan wheel and shaft

## Rustless Steels Employed in Fan Construction

(Continued from Page 507)

readily available. Generally, they are not carried in warehouse stock; therefore, the fan has to be designed either to eliminate them, or to use shapes made by hand either by braking or welding, or to use ordinary steel structurals so located as to be isolated from the corrosive action of the gases handled.

### Elevated Temperatures Require Structural Strength

Utilization of rustless steel for elevated temperature operation can be considered as radically different from use of the same metal where high temperatures are not involved. In the latter case, the strength of material has very little to do with the design, whereas for elevated temperatures, fan design and material selection are governed by the one main purpose of providing a structure that will, under the extreme conditions, hold itself together. This neglects consideration of scaling, warping, etc., which are relatively minor worries.

When the air the fan is moving gets extremely hot, ordinary steel cannot be used inside the fan, not because of any particular "quick pull" weakness of steel, but because the steel creeps. The phenomenon of creep, which is not generally understood, presents the vital reason for the use of rustless steel in fan wheel parts operating at elevated temperatures.

A rough idea of the phenomenon of creep may be had by likening the hot steel to a piece of soft wax at ordinary temperature. If this wax were rolled into a "rod" and then hung up by one end, it would, of course, stretch and finally pull apart of its own

weight. If a rod of cold steel were long enough, and held by one end, it too would pull apart, but there would be very little stretch. One section near the end that is anchored would neck and snap. However, were the rod kept at red heat over its entire length, it would stretch out along its length somewhat the same as the wax rod. It would "creep." The rate of this creep is an exponential function of strain and usually obtains in two stages: first, a rapid rate until an internal hardening is given the metal, then, a slower rate on to failure.

### High Chrome Steel for 950-Deg. Service

The only reason why the high-chrome steel would be used for fan construction instead of the 18-8 is because of its slight difference in price,

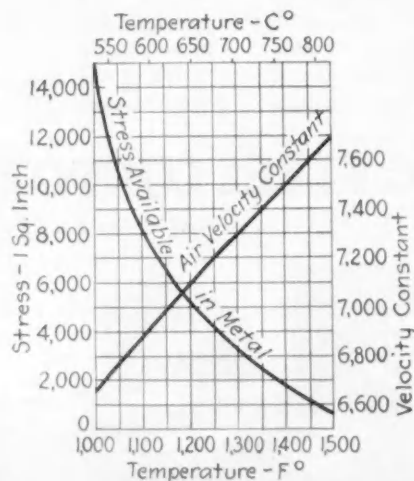


Fig. 4—Effect of temperature on air velocity constant and on strength of 18-8 alloys used in fan construction

although there is some divergence of opinion as to which metal is better when gas at elevated temperatures contains sulphur. It has been the experience of the writer that the 18-8 alloy is much the better, although other users claim the very high-chrome steel suffers less from inter-crystalline corrosion than the 18-8.

The chrome steel serves well, however, for temperatures around 950 deg. F., but for temperatures from 1000 to 1200 deg. F., all internal parts of a fan, especially the wheel, should be made of the 18-8 alloy. The housing if insulated, should be made of 18-8 alloy, if not insulated, it can be made of the high-chrome steel where temperatures range from 1000 to 1200 deg. F. Ordinary steel can be used for insulated housings where gas temperatures are less than 1000 deg. F.

The shaft of the fan, while usually made of 18-8 alloy, could be made of ordinary steel so far as its deflection is concerned. Hollow water-cooled steel shafts made of very extra-heavy steel tubing have been successful if the shaft, which usually would be below the dewpoint of the gas, does not precipitate destructive acids. There is a misconception that rustless steel, which has a much higher ultimate strength than ordinary steel, will prevent excessive deflection of a fan blade or a shaft at ordinary temperatures. The rustless steel actually will deflect slightly more than ordinary carbon steel, because the modulus of elasticity is slightly less. However, it will stand more deformation without becoming permanently bent.

When a rustless steel at elevated temperature is in a hot atmosphere containing sulphur, a peculiar grain separation or inter-crystalline corrosion, takes place and the metal becomes extremely brittle. As stated, the writer has never seen a fan made of 18-8 alloy that has failed from this cause, but has witnessed several failures under the same condition where high-chrome steel was used. However, others have claimed the opposite: that the chrome steel behaved better. A possible explanation is that a chrome steel containing as high as 30 per cent chromium is not practical for ordinary die operations, hence, is not used in the fan industry to any great extent. The 12 to 14 per cent chrome steel, which is the metal that has failed, is more generally used in fan construction.

### How Elevated Temperature Affects Fan Selection and Design

It will be noted that in speaking of elevated temperatures, 1200 deg. F. is the maximum that has been mentioned. There is a very definite reason for this because if higher temperatures were involved, stronger materials than those now on the market would have to be used, or the fan life greatly shortened.

(Continued on Advertising Page 12)

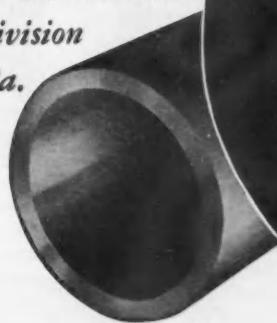


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**Pittsburgh  
Seamless  
HIGH PRESSURE  
PIPING**



How elevated temperature affects fan selection and design may be seen further from the fan engineering details that follow.

Centrifugal fans may be classified into three general types, depending upon the shape of the blade and its relative position as to rotation. These are called the forward curved fan, the backward curved fan, and the radial blade fan, according to whether the blade is concave toward the direction of rotation as in Fig. 1, whether it is convex in operating "backward" as in Fig. 2, or whether it is radial as shown in Fig. 3, which is the early type of steel-plate fan.

The main difference in these three types of fans is in the relative speeds at which they have to operate to produce a given pressure. Atmospheric air, that is, standard 70 deg. air at normal barometer and 50 per cent relative humidity, when moving 4006 ft. per min., will, upon impact, produce enough pressure to raise a column of water 1-in. high. This figure ordinarily is used in round numbers as 4000 and is called the air velocity constant. If the air gets warmer, it becomes lighter, or less dense, and the velocity has to increase to produce this 1-in. pressure. This velocity constant varies as the square root of the absolute temperature change. At 1500 deg. F. it is about 7700, or the air has to move 7700 ft. per min. to produce 1-in. pressure upon impact.

If a fan wheel is rotated to give a peripheral speed of 4000 ft. per min. at the tip of the blade at 70 deg. F., a theoretical 1-in. peripheral velocity pressure is produced. This peripheral velocity is expressed in terms of pressure in order to compare it with the static pressure capacity of the fan. The static pressure is the radial pressure within the enclosure, or the duct, that tends to burst the duct. This is caused by part of the kinetic energy of the fan being converted into potential energy to overcome the resistance of the system.

The peripheral velocity pressure then gives us a means of comparing these fans as follows: the forward curved fan produces about 2.3 times as much static pressure as the peripheral velocity pressure, the radial type of fan produces about 1.4 times the peripheral velocity pressure, while the high-speed fan produces about 0.75 times the peripheral velocity pressure.

Thus it will be seen that to produce a given pressure, a fan wheel has to operate at a given speed, depending upon its type, and this in turn produces a given centrifugal force. It is this centrifugal force that limits the pressure producing capacity of the fan when the strain produced by this force equals the available stress of the materials used to construct the wheel.

As the temperature increases, the stress available in the metal rapid-

ly decreases, while at the same time the air velocity constant, or the speed requirement of the wheel increases.

There is one factor that tends to alleviate the difficulty, and that is, as the temperature increases the requirement for the pressure decreases directly as the absolute temperature, but this is not as good as it sounds for the reason that 1000 deg. F. is not twice as hot as 500 deg. F., but only about  $1\frac{1}{2}$  times as hot, because 1000 deg. F. is 1460 deg. absolute, and 500 deg. F. is 960 deg. absolute.

The chart, Fig. 4, shows the "collision" of the decreasing stress available with the increasing air velocity constant. The chart is based on the 18-8 alloy.

Applying this to a practical example: assume that 5 in. static pressure at 1200 deg. F. is required and that the Sirocco fan will be used. The peripheral velocity pressure would be  $5/2.3$ , which is 2.18 in. The square root of this is 1.48 in. Referring to Fig. 4, the air velocity constant is 7100, which, when multiplied by 1.48 in. equals about 10,500 ft. per min. tip speed. If this 5 in. static pressure were produced with air at 70 deg. F., with a velocity constant of 4000, the tip speed would be about 5900 ft. per min. and the strain a little more than one quarter of the strain for producing 5 in. at 1200 deg. F.

While this condition obtains, the material is getting weaker, that is, whereas we had available about 25,000 lb. per sq. in. at 70 deg., we have only 5200 lb. per sq. in. available at 1200 deg. F. because of this weakened condition of the high temperature metal.

Assume only 200 deg. temperature increase and applying the same calculations, it will be found that about  $1\frac{1}{2}$ -in. pressure is the limit. At 100 deg. further increase, or 1500 deg. F., this is reduced to somewhere around  $\frac{1}{2}$  in.

Fans could be built for 1500 deg. F. operation for producing 2 or 3 in. pressure if the purchaser considered the fan expendable material; that is, if the fan can save enough money in one year's time to more than pay for its use, then it would be a good investment, even if the fan would have to be replaced at the end of the year. Perhaps even six months time would make the fan a good investment. Such an application is in the many annealing furnaces and in some open-hearth furnaces. The open-hearth furnace is not as important an application for the fan because after all a stack can be used, and the stack capacity for producing draft goes up with the temperature. In annealing furnaces, however, the stack cannot be used because the gases are recirculated.

Thus the stress value shown in Fig. 4 can be increased several times, inasmuch as it is on the basis of 1 per cent creep in 100,000 hr. If this

were changed to 10,000 hr., or roughly, a year, a higher stress could be used, but the shorter life of the fan would have to be justified by economic considerations such as mentioned above.

## Building Revival Necessary Says Charles F. Abbott

Charles F. Abbott, executive director of the American Institute of Steel Construction, who recently returned from a two-months' trip surveying conditions in the steel construction industry, reports that he found a general preparedness for a revival of business. Mr. Abbott said:

"To hope for any speedy recovery in this country through a natural process of reviving manufacturing and the consumption of goods of current necessity is utterly hopeless. A revival of manufacturing and marketing cannot be effected upon any permanent basis unless we likewise revive construction in this country. Construction, properly planned and economically executed, will represent additions to the wealth of the nation. It will assist in the dissipation of the tax load by creating more taxable property.

"There are innumerable projects ready for financing right now. The American Institute of Steel Construction made a survey last year of the pending projects of a self-liquidating nature and reported to the Reconstruction Finance Corporation a number calling for appropriations in excess of one and a quarter billion dollars. Recently I have visited most of the important cities of the country from coast to coast, conferring with architects, engineers and steel constructors, and I find even more opportunities listed on their books, but dormant because investment money is scarce."

## Tool Engineers Name Officers for 1933

At a meeting of the board of directors of the American Society of Tool Engineers, held March 16, officers for 1933 were announced as follows: President, W. H. Smila, tool engineer, Jefferson plant, Chrysler Corp.; vice-presidents, Frank Hartlep, chief tool engineer, Timken-Detroit Axle Co., and T. B. Carpenter, assistant tool supervisor, General Motors Truck Corp.; secretary, A. M. Sargent, president and general manager, Pioneer Engineering & Mfg. Co.; and treasurer, J. F. Slavik, sales engineer, Warner & Swasey Co. J. A. Siegel, assistant chief tool engineer, Packard Motor Car Co., and past president of the society, is chairman of the meetings committee. The society was organized March 3, 1932; headquarters are at 8316 Woodward Avenue, Detroit.



# GREATER ENDURANCE



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# FEDERAL BEARINGS





# Iron and Steel Exports, Mainly Scrap, Largest Since April, 1932

Exports of Iron and Steel from the United States  
(In Gross Tons)

	February		Two Months Ended February	
	1933	1932	1933	1932
Pig iron .....	192	377	563	702
Ferromanganese .....				5
Scrap .....	38,141	8,883	69,954	16,455
<i>Pig iron, ferroalloys and scrap</i> .....	<i>38,333</i>	<i>9,260</i>	<i>70,517</i>	<i>17,162</i>
Ingots, blooms, billets, sheet bar .....	4	23	95	183
Skelp .....	238	2,447	395	3,503
Wire rods .....	2,035	2,468	2,746	3,576
<i>Semi-finished steel</i> .....	<i>2,277</i>	<i>4,938</i>	<i>3,236</i>	<i>7,262</i>
Steel bars .....	1,390	1,631	2,475	3,400
Alloy steel bars .....	45	225	75	270
Iron bars .....	21	13	44	43
Plates, iron and steel .....	517	792	857	1,837
Sheets, galvanized steel .....	1,539	2,515	3,991	5,120
Sheets, galvanized iron .....	34	85	69	224
Sheets, black steel .....	1,961	2,401	4,518	5,791
Sheets, black iron .....	154	324	277	499
Hoops, bands, strip steel .....	1,432	2,340	2,376	4,203
Tin plate;terne plate .....	2,905	2,376	7,338	7,687
Structural shapes, plain material .....	556	1,381	1,137	2,173
Structural material, fabricated .....	824	1,109	1,205	2,770
Tank, steel .....	24	214	503	372
Steel rails .....	759	1,893	3,079	3,058
Rail fastenings, switches, frogs, etc. ....	156	531	541	879
Boiler tubes .....	546	260	848	482
Casing and oil-line pipe .....	3,521	420	4,682	1,597
Pipe, black and galvanized, welded steel ..	1,837	2,213	3,153	4,792
Pipe, black and galvanized, welded iron ..	41	180	118	255
Plain wire .....	500	1,045	890	1,743
Barbed wire and woven wire fencing .....	1,775	1,189	2,667	2,667
Wire cloth and screening .....	28	44	68	86
Wire rope .....	84	191	191	346
Wire nails .....	479	476	1,080	1,678
Other nails and tacks .....	392	259	607	557
Horseshoes .....	3	2	6	25
<i>Rolled and finished steel</i> .....	<i>21,523</i>	<i>24,109</i>	<i>42,795</i>	<i>52,554</i>
Cast iron pipe and fittings .....	395	423	829	922
Malleable iron screwed fittings .....	104	132	216	249
Car wheels and axles .....	429	336	1,206	480
Iron castings .....	80	176	399	316
Steel castings .....	47	126	85	224
Forgings .....	224	349	427	827
<i>Castings and forgings</i> .....	<i>1,279</i>	<i>1,542</i>	<i>3,172</i>	<i>3,018</i>
All other .....	524	635	936	1,136
Total .....	63,936	40,484	120,656	81,132

Imports of Iron and Steel Products into the United States  
(In Gross Tons)

	February		Two Months Ended February	
	1933	1932	1933	1932
Pig iron .....	8,416	5,734	14,860	15,103
Sponge iron .....	53		53	
Ferromanganese and spiegeleisen* .....	875	2,678	4,431	4,237
Ferrosilicon .....		12	4	30
Other ferroalloys .....		100	1	250
Scrap .....	204	558	416	969
<i>Pig iron, ferroalloys and scrap</i> .....	<i>9,548</i>	<i>9,082</i>	<i>19,765</i>	<i>20,609</i>
Steel ingots, blooms, billets, etc. ....	53	16	56	1,527
Wire rods .....	918	843	2,114	1,829
<i>Semi-finished steel</i> .....	<i>971</i>	<i>859</i>	<i>2,170</i>	<i>3,356</i>
Concrete reinforcement bars .....	182	2,185	448	5,613
Hollow steel bars .....	74	31	158	84
Merchant steel bars .....	1,812	3,195	3,476	7,012
Iron bars .....	21	99	37	117
Iron slabs .....			1	
Boiler and other plate .....	11		51	30
Sheets, skelp and saw plate .....	1,042	2,735	2,279	2,995
Tin plate .....	20	26	39	76
Structural shapes .....	1,597	2,919	3,270	6,698
Sheet piling .....				
Rails and rail fastenings .....	78	221	279	403
Welded pipe .....	353	288	633	692
Other pipe .....	61	368	138	576
Barbed wire .....	1,100	1,400	2,817	2,725
Round iron and steel wire .....	173	232	328	379
Flat wire and strip steel .....	60	68	125	139
Wire rope and strand .....	137	129	264	268
Other wire .....	63	73	288	157
Hoops and bands .....	1,751	1,896	3,196	3,930
Nails, tacks and staples .....	558	797	1,565	1,594
Bolts, nuts and rivets .....	21	19	41	37
Other finished steel .....	24	14	75	20
<i>Rolled and finished steel</i> .....	<i>9,138</i>	<i>16,695</i>	<i>19,508</i>	<i>33,542</i>
Cast iron pipe and fittings .....			54	11
Castings and forgings .....	91	102	143	273
Total .....	19,748	26,738	41,640	57,791

\*Manganese content only.

†Chromium content only.

‡Silicon content only.

WASHINGTON, March 28.—While they amounted to only 63,936 gross tons, exports of iron and steel in February, 1933, were the highest since April, 1932. The February movement showed a gain of 7216 tons over that of January. The daily averages for the two months were 2283 tons and 1830 tons respectively. Scrap made up the largest item in each month.

Imports in February were 19,748 tons, the lowest since July, 1932.

Scrap exports in February totaled 38,141 tons, of which 34,001 tons went to Japan and 3568 tons to Italy. Canada took 596 tons and Panama 451 tons of steel bars, total shipments of which were 1390 tons. Of the 1539 tons of galvanized steel sheets exported, 996 tons went to the Philippine Islands. Black steel sheet exports, totaling 1961 tons, went principally to France (754 tons), Canada (584 tons) and China (389 tons). China took 987 tons and the Netherlands East Indies took 612 tons of the 2905 tons of tin plate exported. Of the 3434 tons of seamless casing and oil line pipe exported, 2212 tons went to Turkey and 938 tons to Palestine.

Pig iron constituted the chief item of imports in February, with a total of 8416 tons. It came principally from the Netherlands and India.

By reason of the heavy scrap purchases, Japan led as the consumer of exports in February, taking 36,454 tons.

United States Imports of Pig Iron  
(In Gross Tons)

	February		Two Months Ended February	
	1933	1932	1933	1932
India .....	2,470	606	5,679	4,157
United Kingdom .....	150	400	150	500
Germany .....	34	135	34	135
France .....				
Netherlands .....	5,496	4,493	7,565	9,732
Sweden .....				98
Norway .....				
Canada .....	207		369	
Belgium .....				200
All others .....	59	100	1,063	281
Total .....	8,416	5,734	14,860	15,103

Sources of American Imports of Iron Ore  
(In Gross Tons)

	February		Two Months Ended February	
	1933	1932	1933	1932
Chile .....				
Cuba .....			150	
Spain .....				
Sweden .....				
French Africa .....				
Canada .....				
Russia .....			6,800	
Other countries .....	*7,115		8,119	
Total .....	7,115		15,069	

\*Imported from Norway.